that the mass had enlarged and was somewhat tender. No axillary lymph nodes were felt.

Roentgenological examination was omitted.

On September 9, 1935, a simple mammectomy was done and the patient made an uneventful recovery.

Pathological Report.—The specimen consisted of a piece of tissue which had been bisected. It was covered on one surface by skin. Underlying the movable skin was a cyst, 3.5 cm. in diameter, lined by a membrane. The greater portion of cyst cavity was filled by a gray pink, granular, translucent, soft, friable mass which was infiltrating the underlying breast tissue. The cavity also contained clotted blood.

Microscopical examination showed the cyst to be lined with a single row of flat epithelial cells. The intracystic mass consisted of lawlessly growing strands of epithelium infiltrating the underlying fibrous cyst wall and breast tissue. The epithelial cells contained a moderate number of mitoses. In places the cells were arranged to form an imperfect glandular structure. There was some extravasation of serum and blood cells into the mass and the cyst cavity contained fibrin and red blood cells in large amounts.

The anatomical diagnosis was intracystic papillocarcinoma.

SUMMARY

A case of intracystic papilloma with transformation into a papillocarcinoma has been presented in a patient 54 years of age. The duration of the tumor was three years and the duration of the malignancy one month. The complaint was a tumor. No discharge from the nipple was mentioned in the history. There was no pain. The axillary lymph nodes were not felt.

SUMMARY AND CONCLUSION

Six cases of intracystic papillomata of the breast have been presented, 50 per cent benign and 50 per cent malignant.

The separation of benign from malignant ones has been made only after microscopical study of specimens.

Signs of malignancy were: variation in size, shape, and staining of the cells and their nuclei, mitoses and invasion.

We have presented a case which was observed clinically through the transformation from a benign to a malignant tumor and cited others in the literature.

Only one of our cases showed metastasis and that only after the cyst wall had been invaded.

We believe that many of these intracystic lesions became malignant early in their existence and that others require a longer time.

Clinical signs of rapid progression indicate malignant transformation, but hemorrhagic discharge from the nipple is of little importance in this regard.

All these intracystic growths are potentially malignant.*

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DISCUSSION (*Abstract*)

Dr. D. J. Pessagno, Baltimore, Md.—Dr. Dees and Dr. Schmeisser have told you about the pathology of intracystic papilloma and papillocarcinoma of the breast.

Surgeons are asked to relieve these patients of their symptoms. A bloody discharge from the nipple, with or without a tumor, is the most striking symptom of these diseases. When a bloody discharge from the nipple is the result of trauma or late carcinoma, the cause is self-evident. Otherwise, when associated with a palpable tumor, such a discharge indicates the presence of a papillomatous cyst or a cancer cyst.

Occasionally inflammation about the cyst fixes the skin so that the signs are those of a malignant growth. In such cases and wherever there is any doubt about the character of the tumor, exploratory excision, including some surrounding breast tissue, should be done. The cancer cyst is smooth walled and contains bloody material. If this is found, immediate operation for cancer should be performed after packing the wound with an alcohol sponge. Draperies, instruments, gloves, and so on, used in the exploration are replaced by fresh sterilized material.

After turning out the contents of the cyst, a papilloma can be seen if one exists. The base of the papil-

*We are indebted for the illustrations in this study to Dr. Joseph L. Scianni, Artist, University of Tennessee, Pathological Institute.

loma should be examined by the naked eye or frozen section. If one of these indicates malignancy, cancer operation should be performed at once, using the precautions already mentioned. If the papillomatous cyst is benign, we believe it is best to remove the breast because these cysts practically always are multiple and if a simple excision is done, the patient will return for a second and possibly a third operation. Papillomatous cysts are potentially malignant and as they are generally multiple, complete excision of the breast removes the pre-cancerous focus.

INTESTINAL OBSTRUCTION DUE TO POSTURE*

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The most conspicuous intestinal lesion with which the surgeon has to deal is obstruction. This may be acute when the obstruction is complete, or chronic when the obstruction is only partial. We must, however, bear in mind that such terms are relative and that the condition is shifting, for acute obstruction may be but a phase of chronic obstruction and chronic obstruction may supervene on subsiding acute obstruction. In the broad sense any interference of the intestinal current constitutes intestinal obstruction. Paralytic ileus and spastic ileus are due to nerve imbalance. Vascular obstruction is due to mesenteric thrombosis and embolism. In the more restricted interpretation of common usage, the term intestinal obstruction is employed to denote obstruction of mechanical origin which alone will be discussed in this paper.

In obstruction due to narrowing of the lumen of the gut we must consider atresia, which is a complete lack of intestinal continuity such as imperforate anal canal, which occurs in about one in every five thousand births, and is usually attended by other embryological defects. Acquired strictures may be due to inflammatory, neoplastic, and traumatic causes.

Obturation obstructions are varied. Enteroliths may be divided into three classes: true enteroliths with small organic nuclei develop in the presence of stasis in an alkaline medium and are usually found in the large intestine; mixed enteroliths or phytobezoars are ingested and not digested; medicament enteroliths follow prolonged use of calcium, magnesium, bismuth and salol.

Other causes of obstruction are gallstones in large quantities emptying into the intestinal tract through a biliary fistula between the bladder and duodenum; foreign bodies in demented and hysterical persons, such as coins, whistles, safety-pins, hooks, nails, and screws; worm masses in children found especially following vermifuge therapy; fecal obstruction (Hirschsprung's disease) which is usually found in congenital enlargement of the colon. All these anomalies may produce a plugging obstruction.

Compression obstruction is usually due to retroperitoneal tumors, mesentery tumors, or inflammatory masses. The boundaries of the pelvis account for their frequency in that location.

Adhesion and band obstruction constitute a very large group, and usually develop after operation. Suppurative appendicitis necessitating drainage is most frequent; operation on female pelvic organs ranks second.

Hernia obstruction is the most frequent of all classes, is due to a large loop of intestine's gaining entrance to the hernial sac as a result of increased abdominal pressure, the incidence of concurrent intestinal edema and reflex contraction of the hernial ring preventing reduction. Strangulation of internal hernia is relatively infrequent. Femoral hernia is much less common than inguinal hernia, yet the frequency of strangulation approximates that of inguinal hernia very closely. Rigid fascial insertion at the um-

Fig. 1
Dilated sigmoid loop extending to splenic flexure covering descending colon.

*Chairman's Address, Section on Railway Surgery, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

Fig. 2
Dilated sigmoid loop extending to hepatic flexure, covering cecum and ascending colon, indicating free excursion.

bilicus makes for strangulation of umbilical hernia, which is relatively infrequent.

Intussusception obstruction varies in frequency in different countries; the percentage is definitely lower in the United States. About 75 per cent of all instances of the disease are seen in children under two years of age and it occurs approximately three times as frequently in the male. The etiological agent in the infant is usually not apparent; in adults on the contrary the cause is usually in evidence. The more frequent occurrence is at the ileocecal juncture.

Volvulus obstruction or torsion of the bowel occurs usually in the sigmoid flexure where the limbs of the loop are closely approximated. In most instances when volvulus is obtained at this point, an unusually large bowel with a long mesentery is present. Occasionally it involves the cecum and terminal ileum, and less commonly the transverse colon and the small intestine. The transverse colon, despite its extreme range of motion, escapes frequent torsion because its points of fixation at the hepatic and splenic flexures are so far removed from one another. Volvulus obstruction constitutes about 10 per cent of the total number of cases, occurs three or four times more frequently in men than in women, and its greatest incidence occurs in middle and advanced years. Spastic colitis with gaseous distention of the colon may occasionally simulate the picture of torsion.

The chief complaints of patients with intestinal obstruction are pain and vomiting. Later, when the obstruction has become well established, distention is present. The pain is intermittent and crampy and is usually described by the patient as a "gas pain." The cramp is not usually long in duration; it reaches its peak quickly, and after being sustained in its maximum severity for two or three minutes, it abruptly ceases. A plateau type of pain curve is practically never observed. The colicky distress may recur frequently or at long intervals, depending on the nature of the obstruction. There is only one variety of obstruction of the bowel in which distention may be great and yet no vomiting occur, that is, obstruction beyond the splenic flexure. Beyond this point, due to the presence of the proximal competent ileocolic sphincter, which behaves like a check-valve, permitting gas and fluid to come into the colon from the ileum but preventing outflow, the distention remains limited to the colon, there being no regurgitation into the ileum, the small intestine does not partake in the distention and despite enormous distention there may be no vomiting.

In general it may be said that agents of demonstrated value in the relief of obstruction are: (1) eradication of obstructing mechanism by operation, (2) decompression of the distended intestines and circumventing the obstruction by entero-anastomosis; (3) decompression of the dis-

Fig. 3
Big gut with large sigmoidal loop removed.

Fig. 4
Acute constriction at site of end-to-end anastomosis.

tended intestine by suction applied to an inlying duodenal tube; (4) administration of saline solution; (5) blood transfusion.

The ideal objective in mechanical occlusion is release or removal of the obstructing agent. In early mechanical obstruction, determining its exact nature and accomplishing its release is the procedure of election. In late obstruction the above procedure may be associated with unnecessary hazard and experience has shown that decompression of the intestine as a preliminary procedure is much safer.

When the blood supply is compromised, freeing the tract of the obstruction is almost invariably mandatory, no matter how ill the patient may be.

Miss A. P., aged 53, Canadian by birth, nurse by occupation, was admitted to the surgical ward because of acute daily abdominal distention.

Her past history was negative except for the usual diseases of childhood, chronic constipation since childhood, typhoid fever at 25 years of age, and a mild thyrotoxicosis at 27 years of age, which responded to treatment after tonsillectomy.

Her present history dates back two years, when she began to have attacks of nausea, vomiting, gas distention and faintness, with a headache and severe pain in the lower back. The attacks gradually became more frequent and increased in intensity, especially with reference to gas distention in the afternoon and evening. For the previous several weeks an enema each night had been necessary for relief of distention and discomfort; great quantities of flatus were passed during and after the enema. The abdomen would flatten out during the night and appear perfectly normal by morning. After she had been on duty the same condition would recur by evening. During these two years the patient was very careful of her diet and had kept reducing her food until she was very much undernourished with low resistance.

Incidentally about six months prior to the onset of her trouble she had reduced 45 pounds by exercise and diet, thereby lessening the intra-abdominal pressure, giving the intestines free excursion and an opportunity to become obstructed by faulty position.

This history, with the obstruction showing each evening after she had been in erect position all day, and disappearing during the night after hours in prone position, indicated postural obstruction.

X-ray of the lower spine showed hypertrophic osteoarthritis. Colitis incident to the obstruction was responsible for the activity in this region, causing the intense back pain and headache. The first x-ray of the colon showed a dilated sigmoid loop extending to the splenic flexure. The second x-ray a few days later showed a loop on the opposite side extending to the hepatic flexure, indicating free excursion of a redundant sigmoid.

At operation 18 inches of redundant cecum were removed; end-to-end anastomosis performed with a wide opening abdominal incision sutured in layers with eight silkworm gut retention sutures extending to the peritoneum. Because of poor resistance and slow recuperative powers the retention sutures were not removed until the tenth day. The following day the wound was wide open, necessitating resuture. After a stormy convalescence the patient made an excellent recovery, boasting of her fine condition for six months, then began to have a return of symptoms of obstruction. X-ray showed an annular constriction the size of a lead pencil at the site of anastomosis. At the second operation a

Fig. 5
Normal lateral anastomosis.

lateral anastomosis was performed with a wide opening. Convalescence was normal and recovery uneventful. Some weeks later a barium enema with fluoroscopy and x-ray film showed a normally functioning anastomosis with wide opening. The patient is now in excellent condition with a normally functioning gastro-intestinal tract.

In this case, an extra 18-inch loop of sigmoid was held in functional position until intra-abdominal pressure was reduced by 45 pounds loss in weight. The erect position allowed the loop to sag and rotate, causing complete volvulus obstruction which did not become acute because the prone position with the aid of enemas relieved the obstruction.

ACUTE MECHANICAL INTESTINAL OBSTRUCTION*

TREATMENT AND RESULTS

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The motive leading to the publication of this paper is to reiterate, as forcibly as we can, the opinion that now, as heretofore, the basic treatment for acute mechanical obstruction of the bowel is operation at the earliest possible moment. This opinion has been expressed by so many others with more authority and experience than ourselves that it may seem unnecessary to repeat an oft-told tale. There are two reasons why we do not share this view. First, the development of certain valuable accessory measures in the treatment of obstruction has tended to direct attention to these subsidiary procedures and thus to obscure the central importance of prompt surgery. Second, in spite of all that has been said and written on the treatment of obstruction, the results generally obtained seem to us quite unsatisfactory and the mortality unnecessarily high.

To take up first the danger of losing sight of the primary importance of prompt operation. This situation has arisen, interestingly and paradoxically, from the very considerable advance that has been made in our understanding of the pathology and perverted physiology of intestinal obstruction. The whole subject has attracted a great deal of interest for the past three or four decades, and a very large amount of experimental work has been done in the search for a better understanding of it. As a result of these endeavors by numerous workers in many clinics and laboratories, important facts have emerged. Without attempting to assign credit or provide a bibliographic reference table, which may be found attached to numerous recent articles, there emerge from the mass of literature these basic facts. First, obstruction that persists more than a few hours sets up a chain of disturbances leading to widespread alteration in body composition, that is: loss of water, loss of acid (chlorine) ions, increased nonprotein nitrogen in the circulating blood, and so on, which, expressed in other terms, means the threat of dehydration, alkalosis, and uremia. Second, increasing pressure of accumulated gas and fluid within the bowel alters the circulation in the bowel wall, produces pressure anemia with danger of necrosis and perforation, changes the absorptive and resistive qualities of the bowel wall so that toxic material may pass into and through it and thus open opportunities for toxic absorption, perforation, peritonitis and general infection. Third, the intensity of these processes increases directly with the time elapsed. Fourth, those obstructions high in the jejunum develop dangerous and fatal situations much more rapidly than those low in the colon. Fifth, obstructions of such a nature that the circulation of the bowel wall is directly compromised by pressure on vessels, as in strangulations, are much more rapidly dangerous than those with simple obstructions of the lumen, where vascular impairment develops only secondarily because of pressure from distention of the gut.

The recognition of these various factors as important parts of the whole clinical process of mechanical obstruction has naturally directed attention toward correcting or combating them. Thus the administration of water, sodium chloride and glucose, by intravenous injections, has been employed to overcome the tendency to dehydration, alkalosis and uremia. The results of this therapeutic measure have been definitely gratifying and its development reflects great credit upon the investigators who paved the way for its clinical use. Also the appreciation of the seriousness of intra-intestinal pressure has stimulated efforts to decompress the bowel. It is true that the emptying of the stomach by the ordinary use of the stomach tube held a place in the treatment of obstruction years ago, but much improved methods, involving the passage of tubes into the duodenum and the application of

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ingenious suction devices, have greatly increased the efficiency of the measures designed to empty the upper alimentary tract and relieve it of abnormal pressure. These various procedures have added much to our ability to cope with the problems of obstruction and it seems ungracious to express the opinion that they have succeeded too well, and yet not well enough. Too well, because the often striking improvement in the patient leads to a deceptive feeling of safety; not well enough, because except in a limited and special group of cases, they do nothing to correct the basic and essential lesion, the mechanical blockage of the gut. It is true, perhaps, that in some cases where a kink fairly high in the small bowel is the source of the obstruction, release of pressure against it by decompression from above may lead to clearing up the trouble, but in the many other forms of mechanical obstruction, this cannot seriously be hoped for. Nevertheless, the advice has been given that the measures described above, decompression and intravenous therapy, should be tried first, and the patient observed for a time with the expectation that some cases may avoid surgery, and that those later requiring it may be recognized promptly enough to be operated upon before irreparable harm has been done. This we believe unsound advice and dangerous practice. Even assuming, which we do not believe to be true, that a considerable proportion of cases will be cured without operation, we do not believe that there are any criteria by which one can tell when a given case reaches or passes the point beyond which recovery cannot take place, or what the exact nature of the obstruction is or the extent of local damage to the bowel wall. For all of these reasons, we would repeat that the safe rule for general observance is, operate as soon as a diagnosis of acute mechanical obstruction is made, employing intravenous therapy and decompression of the upper alimentary tract as very important concomitant but supplementary measures.

It will be observed that this dictum applies to acute mechanical obstruction. It should be added that it does not apply with equal force to incomplete acute obstruction or to chronic obstruction. It does not apply at all to paralytic or adynamic ileus. In our judgment, pure paralytic ileus is not benefited by any surgical attack thus far developed, and is usually made worse by it. It, therefore, becomes important to distinguish between mechanical obstruction and paralytic ileus. Admittedly this is not always easy to do. Many confusing cases are seen, in part because late mechanical obstruction becomes complicated by the onset of paralytic ileus. These simple findings help in reaching a decision: crampy intermittent abdominal pain lasting more than four or five hours, gurgles, bubblings and tinklings heard on auscultation of the abdomen synchronously with the spasm of pain, vomiting nearly always but not fecal vomiting, visible peristalsis if present (often not seen), x-ray evidence of fluid or ladder patterns, an abdominal scar, a history of hernia. Given all or most of these findings we believe that, as a rule, a presumptive diagnosis of acute mechanical obstruction is justified and that prompt operation is the best form of treatment. One group of cases should perhaps be exempted from the rigid application of this rule, namely, those developing in the immediate postoperative period following a laparotomy. Many of these are due to fresh, sticky adhesions that may clear up under expectant treatment with decompression and fluid intravenously. Here, and here alone, we think a longer period than four or five hours from onset should elapse before resorting to surgical intervention. How long must be decided by the individual surgeon in the individual case. It is our belief that more damage is actually done by waiting hopefully too long than by intervening prematurely. A rising leukocyte count, x-ray pictures in series showing increasing distention of loops and more fluid levels in spite of decompression, and general progression of symptoms are indications of persistence of the obstruction and the need for exploration. It will be noticed that no emphasis has been placed on marked distention, upward displacement of liver dullness, fecal vomiting or long persisting complete obstipation. These are all signs of late obstruction that is probably already complicated by more or less paralytic ileus.

The second part of this paper considers the results of treatment for acute mechanical obstruction. For years the general reports from numerous clinics have placed the mortality from 35 to as high as 60 per cent. The exceptions are few and usually confined to very small groups of cases. We submit herewith a report in condensed form of 27 consecutive cases treated by us in the past ten years, with certain brief comments appended. It should be stated that during this time no patient was operated upon with the diagnosis of acute mechanical obstruction in whom an obstruction was not discovered.

Case 1.—Miss L. N., Union Memorial 1695, aged 16, July 26, 1926, had had several previous operations for imperforate anus. She was admitted with a history

of obstipation, nausea and vomiting, the duration not definitely stated. Her temperature was 102°, pulse 140, respiration 36, and the blood pressure could not be gotten. The abdomen was distended and silent. The diagnosis of acute intestinal obstruction was made and at operation a greatly distended loop of sigmoid was found. A colostomy was done. She had, following this, an abscess of the abdominal wall which was opened and drained August 11. She left the hospital well fifty days after the original operation. Obstruction was due to a band of adhesions.

Case 2.—Mr. N. H., Union Memorial 12983, aged 30, was admitted August 15, 1932, at 11:00 a. m. He had a history of drained appendectomy in 1912. The onset of the present attack consisted of severe cramp-like pains with nausea and vomiting which began eight hours previous to admission. Examination showed visible peristalsis, noisy abdomen, slight distention, leukocyte count of 10,640, with x-ray findings suggestive of obstruction in the jejunum. A diagnosis of acute mechanical obstruction was made and at operation a band of adhesions was found to be blocking the bowel completely 10 cm. above the ileocecal valve. This band was divided and the patient made an uneventful recovery, being discharged in fourteen days.

Case 3.—Miss R. H., Woman's Hospital U-3-496, aged 38, March 31, 1931, gave a history of rectal operation and was at this time suffering from nausea, vomiting, cramp-like pain and obstipation of two days' duration. She also gave a history of gas, discomfort and constipation for several years. On examination the abdomen was found to be moderately distended and noisy, with no visible peristalsis. No x-rays were taken, leukocyte count was 15,000. A diagnosis of acute intestinal obstruction was made and at operation a carcinoma obstructing the sigmoid was found. A cecostomy was done at this time and later the growth was resected. She was discharged as well in 35 days.

Case 4.—Mrs. M. P., Woman's Hospital 6-554, aged 61, May 30, 1933, gave a history of four previous abdominal operations. Her present trouble started four days previous to her admission and was characterized by nausea, fecal vomiting, cramp-like pain and obstipation. On examination she was found to be dehydrated with a markedly distended noisy abdomen and a leukocyte count of 26,300. Visible peristalsis was evident. No x-rays were taken. A diagnosis of acute mechanical obstruction was made and at operation adhesion completely blocking the small bowel was found. The adhesion was released and the patient made an uneventful recovery after 15 days in the hospital.

Case 5.—Mrs. M. R., Woman's Hospital U-587, aged 49, August 4, 1935, gave a history of four previous abdominal operations. The onset of her present attack was 11 hours previous to admission. It was characterized by nausea, vomiting and severe cramp-like pain. On examination the abdomen was found to be moderately distended and noisy. There was no visible peristalsis, but x-rays showed evidence of obstruction fairly low down in the small bowel. A diagnosis of acute mechanical obstruction was made and at operation an adhesion was found to be obstructing the bowel near the junction of jejunum and ileum. The adhesion was released and the patient made an uneventful recovery, being discharged 20 days after operation.

Case 6.—Mrs. J. W., Union Memorial 32248, aged 46, May 23, 1934, gave a history of two previous abdominal operations. Her present attack started seven days previously and was characterized by cramp-like pain off and on and almost complete obstipation and vomiting, which became fecal toward the last. Examination showed her temperature to be 102.5°, pulse 90, respirations 32, blood pressure 104/70. The abdomen was markedly distended and noisy. Leukocyte count was 10,900. A diagnosis of acute obstruction was made and at operation a loop of small bowel was found to be obstructed by an adhesion from one of the old incisions. The adhesion was released. During convalescence she developed a pulmonary infarct which delayed her recovery. She was discharged cured after 74 days.

Case 7.—Mr. H. G., Union Memorial 30539, aged 67, was seen November 25, 1935. He gave no history of previous abdominal operations, but did have a right indirect inguinal hernia for which he wore a truss. The present attack started three days before admission and was characterized by severe cramp-like pain, nausea, vomiting and obstipation. On examination a markedly distended, noisy abdomen with visible peristalsis in the left lower quadrant was seen. Leukocyte count was 15,250 and blood pressure 104/78. X-rays did not suggest obstruction. A diagnosis of acute obstruction was made and at operation an omental band obstructing the mid-portion of the small bowel was found. This band was divided. The patient made an uneventful recovery, leaving the hospital in 23 days.

Case 8.—Mr. I. H., Union Memorial 44301, aged 69, March 25, 1935, gave no history of previous abdominal operations. His present illness dated back four days and was characterized by severe cramp-like pain, nausea and vomiting, which later became fecal. He had had no bowel movements during this period. Examination showed a moderately distended, noisy abdomen with visible peristalsis. Leukocyte count was 12,600, blood pressure so low it could not be gotten. X-rays showed many fluid levels and indicated that the obstruction was high. Diagnosis of acute obstruction was made and at operation the small bowel was found to be completely blocked by an inflammatory reaction of nonspecific character about two feet below Treitz's ligament. This area was resected and a lateral anastomosis was performed. Convalescence was complicated by pneumonia and severe hiccoughs. However, he was discharged as well after 23 days.

Case 9.—Mr. H. W., Union Memorial 43749, aged 54, was seen February 28, 1935. The patient gave no history of previous abdominal operations and his present illness dated back three days. It was characterized by severe abdominal pain for the first two days and obstipation, nausea and vomiting for the whole period. On examination the abdomen was found to be distended and noisy, but no visible peristalsis was present. Leukocyte count was 10,600 and x-rays showed the large intestine to be greatly distended. A diagnosis of acute obstruction was made and at operation the mid-portion of the sigmoid was found to be obstructed by a band between it and the posterior abdominal wall. This adhesion was released and the patient made an uneventful recovery, being discharged after 16 days.

Case 10.—Mrs. R. L., Union Memorial 14935, aged 45, was seen June 18, 1929. She did not give any his-

tory of a previous abdominal operation, but had had symptoms suggestive of partial obstruction for ten or twelve years. She had been chronically constipated for 23 years. The present attack was of two days' duration and was characterized by severe cramp like pain, but only slight nausea and no vomiting. Examination showed the abdomen to be considerably distended and tender as well as quite noisy. Leukocyte count was 10,500. No x-rays were taken. Diagnosis of acute obstruction was made and at operation a volvulus of the sigmoid with megalocolon was found. The volvulus was released and the megalocolon was resected 12 days later. She made an uneventful recovery from both operations and was discharged as well after 29 days.

Case 11.—Mr. J. M., Union Memorial 24644, aged 53, was seen April 18, 1936. This patient had had a first-stage Mikulicz operation 12 days previously for carcinoma of the sigmoid. His present trouble started upon application of the clamp to crush the septum of the colostomy four days previous to the above date and was characterized by nausea, vomiting and very severe cramp-like pain at times. He had had no bowel movement for four days. Examination showed the temperature to be 102.5°, pulse 130, respirations 34. The abdomen was distended and noisy. Leukocyte count was 11,000. No x-rays were made. A diagnosis of acute obstruction was made and at operation a band between the loops of the colostomy and the fundus of the bladder was found to be obstructing the small bowel 18 inches above the ileocecal valve. This band was divided. The patient made a rather prolonged recovery, being 70 days in the hospital altogether.

Case 12.—Mrs. M. P., Church Home 54049, aged 58, November 30, 1930, gave a history of one previous abdominal operation. Her present illness was of seven days' duration and was characterized by nausea, vomiting, fecal in character towards the last, severe cramp-like pain, and obstipation. Examination showed her temperature to be 100.4°, pulse 130, respirations 24. The abdomen was moderately distended and noisy. Visible peristalsis was very noticeable. Diagnosis of acute obstruction was made and at operation a band from the old scar was found to be obstructing the lower ileum. The bowel was so badly damaged that several feet had to be resected and an entero-enterostomy done. She had a rather badly infected wound, but no other complications and was discharged after a stay of 33 days in the hospital.

Case 13.—Mr. N. B., Church Home 7916, aged 31, July 22, 1934, had had a pelvic laparotomy and gradually developed all the signs and symptoms of acute mechanical obstruction over a period of seven days following the original operation. Examination showed temperature to be 101.5°, pulse 140, respirations 35, blood pressure 80/60, with a markedly distended, nearly silent abdomen. A diagnosis of acute mechanical obstruction was made and confirmed at operation, a loop of ileum being stuck in the pelvis. He also had a mild plastic peritonitis. The loop was freed and the abdomen closed. He had a very complicated convalescence in that an enterostomy had to be done later and great difficulty was experienced in closing this opening. He had a severely infected wound and bronchopneumonia. However, he recovered and was discharged after 80 days in the hospital.

Case 14.—Mrs. M. B., Church Home 11234, aged 60, January 20, 1936, had had no previous abdominal operations, but did give a history of a feeling of fullness and belching for several months. Five days previous to admission she began having severe cramp-like pains associated with nausea and vomiting. She had obstipation of five days' duration. Examination showed the abdomen to be markedly distended, tender, noisy and showing visible peristalsis. The leukocyte count was 12,360. Barium enema showed a complete block in the lower sigmoid. A diagnosis of acute mechanical obstruction was made and at operation a carcinoma obstructing the recto-sigmoidal junction was found. There were generalized peritoneal and liver metastases. A cecostomy was done. The patient made an uneventful recovery from the obstruction and was discharged from the hospital after 70 days with the cecostomy still open.

Case 15.—Mr. H. N., Church Home 39803, aged 51, May 27, 1926, had had no previous abdominal operations, but did have an umbilical hernia. The present illness dated back 12 days and was characterized by symptoms suggestive of partial obstruction. For the previous two days, however, he had been having severe cramp-like pains with nausea and vomiting. Examination showed the abdomen to be moderately distended, painful and noisy. Leukocyte count was 9,840. X-rays were indefinite. Diagnosis of obstruction was made and at operation a carcinoma of the cecum with obstruction of the ileocecal valve was found and a lateral anastomosis was made between the ileum and transverse colon, as there were many metastases. With the exception of an infected wound, he made an uneventful recovery and was discharged after 38 days.

Case 16.—Mr. J. E. M., Church Home 53715, aged 48, October 13, 1930, had had previous appendectomy and had a ventral hernia from the operation which had not been repaired. His present illness started 46 hours previous to admission and was characterized by severe cramp-like pain and obstipation with nausea, but no vomiting. Examination showed slight distention of the abdomen which was very noisy and showed visible peristalsis. A diagnosis of acute obstruction was made and at operation a band attached to the hernia sack obstructing a loop of ileum was found. The obstruction was released and the patient made an uneventful recovery, leaving the hospital after 16 days.

Case 17.—Mrs. A. W., Church Home 51810, aged 53, was seen February 24, 1930. The patient had had a pelvic laparotomy which was followed by a postoperative hernia. She also had an inguinal hernia. Her present illness was of 10 days' duration and was characterized by nausea, fecal vomiting towards the last, severe cramp-like pain and obstipation. Examination showed the abdomen to be slightly distended and only a very moderate amount of bubbling and gurgling was heard. A diagnosis of obstruction was made and at operation the sigmoid was found to be obstructed by an infiltration from a carcinoma of the ovary. A cecostomy was done and the patient discharged after a rather uneventful convalescence with the cecostomy still open.

Case 18.—Mr. N. J. B., Church Home 50785, aged 51, October 11, 1929, had had no previous operations and had no hernias. His present illness was of four days' duration. He had had nausea and vomiting with cramp-like pains for the whole period and obstipation for 48 hours.

Examination showed the abdomen to be moderately distended and slightly noisy. He had marked tenderness in the region of the gallbladder and also in the right lower quadrant. A diagnosis of obstruction with possible gallbladder disease was made. At operation a volvulus of the cecum was found, also an acute infection of the gallbladder with stones was present. The volvulus was released and the gallbladder removed. He developed a paralytic ileus on the third day postoperatively which was treated by duodenal drainage and fluids intravenously. He had a badly infected wound and severe hiccoughs for 14 days. However, he recovered and was discharged, healed, after 33 days.

Case 19.—Miss E. A., Johns Hopkins 40559, aged 30, January 17, 1933, had had a ruptured appendix which was drained two years previously. Some time before that she had had a pelvic laparotomy. Ever since the second operation she had been constipated and had symptoms suggestive of partial obstruction. The present illness was of 14 hours' duration, being characterized by a sudden onset, severe cramp-like pain with nausea and vomiting. Examination showed the abdomen to be moderately distended, noisy and exhibiting visible peristalsis. X-rays showed fluid levels suggesting obstruction in the terminal ileum. A diagnosis of acute obstruction was made and at operation a loop of ileum was found to be obstructed by a pelvic adhesion. The adhesion was released and the patient made an uneventful recovery, being discharged after 16 days.

Case 20.—Miss E. W., Johns Hopkins 67602, aged 38, February 5, 1936, had had one previous abdominal operation. Her present illness was of three days' duration and consisted of nausea, vomiting, obstipation and cramp-like pain, which was very severe at first, but not bad at the time she was seen. Examination showed the abdomen to be moderately distended, very tender and noisy. Her temperature was 97°, pulse 120, leukocyte count 18,400. X-rays showed the small bowel to be distended with fluid levels present. A diagnosis of acute mechanical obstruction was made and at operation the lower ileum was found to be obstructed by a narrow band attached to a chocolate cyst of the right ovary. The adhesion was divided and the cyst removed. She made an uneventful recovery and was discharged after 16 days.

Case 21.—Dr. R. E. P., Johns Hopkins 62042, aged 63, April 28, 1935, had had one previous abdominal operation for a gangrenous strangulated hernia. He had had a piece of ileum resected at that time. The duration of his present illness was 24 hours, and had been characterized by nausea, vomiting and cramp-like pain. Examination showed the abdomen to be moderately distended, noisy and painful with visible peristalsis. Blood pressure was 108/68 and leukocyte count 9,600. No x-rays were taken. A diagnosis of acute obstruction was made and at operation a band of adhesions attached to the old abdominal scar was found to be obstructing the lower ileum. The adhesion was divided and several areas of pressure necrosis were inverted. The patient made an uneventful recovery and was discharged 24 days after operation.

Case 22.—Mr. H. B., Union Memorial 185562, aged 50, June 14, 1936, had had an appendectomy during 1931. His present illness was of seven and a half hours' duration. He was taken with very severe cramp-like pains coming very close together, which continued until the time of operation. He was nauseated and vomited once. Examination showed very slight distention of the abdomen with visible peristalsis and considerable bubbling and gurgling. X-rays showed distention of the small bowel with questionable fluid levels. A diagnosis of acute obstruction was made and at operation a band between the cecum and the brim of the pelvis was found to be completely obstructing the ileum about two feet above the ileocecal valve. The adhesion was divided and the patient made an uneventful recovery.

Case 23.—Mr. C. K., Church Home 11510, aged 62, April 4, 1936, had had a Miles operation for carcinoma of the rectum 20 days previously. His present illness was of three days' duration. He had had a rather uneventful convalescence up to that time, when he was suddenly seized with severe cramp-like pains associated with nausea and vomiting. He had had no bowel movement for three days. Examination showed his temperature to be 101°, pulse 140, respiration 24, blood pressure 120/60, leukocyte count 10,600. The abdomen was moderately distended and noisy. No x-rays were taken. Diagnosis of acute obstruction was made and at operation an obstruction of the lower ileum was found caused by adhesions between the ileum and the cut edge of the colonic mesentery. Except for an infected wound, he made an uneventful recovery and was discharged after 51 days.

Case 24.—Mrs. E. G., Union Memorial 48485, aged 38, January 4, 1936, had had an appendectomy in 1923. Her present illness was of nine hours' duration and was characterized by nausea, but no vomiting and very severe cramp-like pain generalized in character. Examination showed tenderness in the right lower quadrant, but no distention and no waves or intestinal patterns. The abdomen was quite noisy, but the x-rays showed no evidence of obstruction. Leukocyte count was 11,000. Diagnosis of acute obstruction was made and at operation a band was found to be obstructing the ileum three inches proximal to the ileocecal valve. The band was released and the patient made an uncomplicated recovery, being discharged after 15 days.

Case 25.—Mrs. L. R., Woman's Hospital U-6-989, aged 54, October 3, 1933, gave a history of three previous abdominal operations. Her present illness was of five days' duration and had been characterized by obstipation, severe cramp-like pain, nausea and vomiting. Examination showed her temperature to be 97°, pulse 90, respirations 22, blood pressure 104/60. The abdomen was distended, tender and noisy. No peristalsis was visible and no x-rays were taken. The diagnosis was acute obstruction. At operation a carcinoma obstructing the sigmoid was found. A cecostomy was done and the patient was discharged with the cecostomy still open.

Case 26.—Miss A. S., Church Home 5593, aged 54, July 19, 1933, had had one previous abdominal operation. Her present illness was of six days' duration and characterized by nausea, pain, cramp-like in character, and vomiting at times. She had had at least one bowel movement a day since the onset, watery in type, with no pus, blood or mucus. Examination showed temperature 99.6°, pulse 120, respirations 20, blood pressure 90/60. The abdomen was distended and silent. X-rays showed fluid levels in the small bowel. A diag-

nosis of acute obstruction was made and at operation the bowel was found to be obstructed by an adhesion 6 or 8 feet below the ligament of Treitz. The bowel was so badly damaged that three feet of it had to be resected and an entero-enterostomy done. The patient never rallied from the operation and was dead within a few hours.

Case 27.—Miss J. N., Union Memorial 51860, aged 25, June 25, 1936, had had an appendectomy in 1929. She had been uncomfortable at times because of abdominal pain and had not felt well since the operation. Her present illness was of four days' duration and was characterized by very severe cramp-like pain at first, which had practically disappeared at the time of operation, nausea, vomiting and obstipation. Examination showed a temperature of 100°, pulse 94, respirations 20, blood pressure 126/76, and leukocyte count 12,000. The abdomen was moderately distended, noisy and tender. X-rays showed distention and fluid levels in the right lower quadrant. A diagnosis of acute obstruction was made and at operation a band was found between the anti-mesenteric border and the brim of the pelvis near the ileocecal valve. This band was divided. The patient did not do well following operation and several days later she was again explored and a small area of gangrene which had leaked causing peritonitis was found. A tube was inserted through this area, giving the patient an ileostomy. She got along fairly well following this until July 21, 1936, when a colpotomy was done. A large amount of pus was expressed. In the meantime it had been found that she had a bilateral active pulmonary tuberculosis. The organisms were recovered from the sputum and from the drainage from the two peritoneal wounds. She gradually went down hill, in spite of everything that could be done, and finally died from a generalized tuberculous infection 56 days following the original operation.

It will be noted in the above series of cases that in 19 the cause of obstruction was an adhesion or band. All but one of these had produced obstruction somewhere between the mid-point of the small bowel and the ileocecal valve. The very great majority of them were within three or four feet of the junction between the large and small bowel. This is a point well worth remembering when trying to decide where to make the incision and where to look for the obstruction, because it is much easier to start with the collapsed bowel at the cecum and work toward the obstruction in the average case, thereby handling collapsed rather than distended bowel. The patient is much less likely to be put into shock and the bowel is much easier to return to the abdomen, since it is not only collapsed, but usually small in amount. In one case the sigmoid was obstructed by a band. Five cases of carcinoma of the large bowel were included in this series because they all gave a history of sudden, acute obstruction and were found to be completely blocked at the time of operation, the only difference being that their history extended over a longer period and they were not so sick as the other cases, which was, of course, to be expected. There were two cases of volvulus, one of the cecum and one of the sigmoid. One case was obstructed high in the jejunum by an area of regional jejunitis. No cases of obstruction due to gallstones were found during this period, but we have had three, all of which recovered. We have purposely excluded from this series all cases due to strangulated hernias because here the diagnosis and treatment are not only obvious, but we feel that these cases present a rather different aspect of the subject in that they are not only mechanically obstructed, but a closed loop is present. We have excluded cases of mesenteric thrombosis for the same reason. Paralytic ileus was not included because we feel that it is a medical rather than a surgical condition and should be treated by syphonage, enemas, measures to stimulate the contraction of the bowel, and general supportive measures such as fluids and blood intravenously without operation. It will be noted that 18 of these cases had had previous operations which apparently led directly to their obstruction because of the formation of adhesions.

The interval between onset of symptoms and operation in this series varied from seven and a half hours to as long as eleven days. There were four cases operated upon under 12 hours, one at 14, one at 24, three at 48, four at 72, the rest between 72 hours and 11 days. Except for some dilatation and one case in which there were several small areas of gangrene, the bowel was in fair condition within periods up to 72 hours. Beyond this period the bowel damage rapidly increased except for the cases of large bowel obstruction. Of the two cases that died one was a high obstruction of six days' duration, the patient being practically comatose at the time of operation and dying within a few hours afterwards, while the second case was complicated by tuberculous peritonitis and a bilateral pulmonary tuberculosis. Since this patient died 56 days after the original operation with a flat abdomen and no other signs of obstruction, we do not feel that obstruction alone should be blamed for the death.

The most characteristic symptoms were cramp-like pains which occurred in every case, vomiting which occurred in all but three cases, becoming fecal only after three or four days, nausea, which occurred in every case, and obstipation, which was constantly present. The most im-

portant signs were distention, which occurred to some degree in all but one case, which was operated upon within seven and a half hours of onset, noisy abdomen, which was present in all the early cases, visible peristalsis, and x-rays showing distention of the bowel and fluid levels, which were fairly constant when this examination was made. Constant late signs were increase in temperature, respiration and pulse, with a low blood pressure, moderately high leukocyte count and greatly distended, silent abdomen. It is also interesting that both deaths occurred in the late cases and all the radical procedures, such as resection, occurred in the same group. The complications, such as pneumonia and infected wounds, occurred also in the late cases. In the early cases where the bowel was in good condition and all that was necessary to do was to release the band obstructing the bowel, the convalescence was smooth and short. All cases underwent bowel stimulating and decompressive procedures, receiving as well adequate intravenous therapy after operation.

The mortality for this series is 7.7 per cent, which is about one-fifth of the average mortality reported. We are fully aware of the fact that it is foolish to base mortality statistics on such a small series, particularly since Dr. Raymond Pearl tells us that with such a small series the law of chance alone might cause a variation anywhere from zero up to 25 per cent in so far as the proportion of two out of 27 goes. But even assuming the worst of the calculated variations, namely, a 25 per cent mortality instead of our present one, the result would still be well below the average. On the other hand, we might be lucky enough next time not to have to deal with a case of high obstruction of six days' duration nor one complicated by generalized tuberculous infection, thereby giving a chance for a mortality of zero.

SUMMARY

(1) Prompt operation is the basic principle in the treatment of acute mechanical obstruction.

(2) Intravenous fluids and methods of decompression are very important concomitant aids in treatment, but cannot be expected to supplant operation.

(3) Early diagnosis of acute mechanical obstruction can usually be made with a fair amount of certainty.

(4) These conclusions are supported by data from practical clinical experience cited above.

GALLBLADDER DISEASE*

AN EVALUATION OF THE CLINICAL AND RADIOLOGICAL ASPECTS IN SEVEN HUNDRED CASES

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Since the evolution of gallbladder visualization by x-rays, cholecystic disease, one of the commonest afflictions of mankind, has received an unusual amount of publicity in medical literature. Volumes have been written on the subject, but in spite of it, many a puzzling question of that disease still remains unanswered and eludes perfect understanding. Whatever mite of information one can add towards the elucidation of so important a problem is like contributing one more brick to the temple of medical truth, so that it may speedily be completed in our days.

Our undertaking to review the records in our possession of cases of indigestion in which gallbladder disease was suspected has but one prime object, namely: to attempt to correlate the facts in the histories, the findings on physical examination and the clinical laboratory data with the radiological interpretations. The information derived from such a review, we trust, will be of value from diagnostic and therapeutic points of view. To condemn or clear a gallbladder in a given case of indigestion on a mere opinion of a radiologist is like trying a case in a night court without a jury and minus due consideration of the vital facts in the case. Such misjudgments in modern medicine are unfortunately of frequent occurrence and common practice. The medical man is too prone to turn over his case to the x-ray laboratory for a diagnosis. The radiological opinion of gallbladder disease is based on non-visualization, poor concentration, poor or non-emptying after a fat meal. Can we accept such a report with fairness and justice to the patient without further searching for other possible factors responsible for the indigestion? Are we justified to advise surgical intervention or even suggest a suitable plan of medical treatment on one link in the diagnostic chain? Certainly not! The non-emptying of the gallblad-

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der is often associated with chronic gastric catarrh and achylia, or hypochromic anemia, peptic ulcer, chronic appendical stasis, colitis, intestinal parasites, endocrine disturbances, and so on.

In mapping out a plan of treatment in a given case of cholecystitis, due consideration must be given to the above mentioned associated abnormal conditions. The complaint that new and numerous laboratory methods tend to create a generation of less keen clinicians cannot be ignored. We often lay too little stress on the bedside study of the patient, the interpretations of symptoms and signs, and depend solely on the radiological report. True, we do not want to waste time, but we should not miss anything important which might prove to be the key to the diagnosis. To remove a gallbladder because of non-emptying by x-ray visualization and overlook achylia gastrica with hypochromic anemia, malignancy at cardia, or heavy infestation with hookworm, is an unpardonable sin. In our review of cholecystectomized patients who appeared for medical advice because the preoperative symptoms of indigestion were not in the least ameliorated, we have observed such unfortunate oversights. Again, where the history is strongly suggestive of gallstone colic and the first x-ray report was negative, insist on a revisualization. We have carried out this wise precautionary measure in several cases and were rewarded by detecting radiologically definite gallbladder disease. The study of a given case is a search for truth.

According to Dr. Franklin W. White,

"We need accurate methods, good logic and good judgment in conclusion, with no undue stress on any fact."

In the study of our cases, we followed a routine which is complete without being too elaborate, adding special features as need for them became apparent. The routine is as follows:

We always: (a) Take a careful history; (b) make a general physical examination, including throat, teeth, skin, lungs, heart, blood pressure, abdomen and reflexes; (c) analyze the stomach contents, with the patient fasting and after a test breakfast; (d) make a blood picture; (e) examine urine and feces.

We usually obtain: a blood Wassermann reaction, icterus index, liver function test, examination of gastric contents and stool for occult blood, chemical analysis of blood for sugar, and other conditions.

A roentgen ray examination is made of the gallbladder region first, then a barium meal is given for the study of the gastro-intestinal tract.

We occasionally do: a complete blood chemical examination and phenolsulphonephthalein test; a proctoscopic examination; examination after a barium enema; a basal metabolism test; protein sensitization tests for possible allergic manifestations; a biliary drainage.

We have classified our cases according to symptoms and signs present, and divided them into groups.

Group 1.—The disease had a painless onset, usual symptoms of indigestion, intolerance to fats and sweets, mild discomfort after a meal, occasional regurgitation of sour or bitter fluid, fetor oris, aerophagia, pyrosis, nausea, vomiting, disturbances of bowel function, coating of tongue or burning of tip and edges, lump in throat and choking sensation, headaches, dull or sharp, periodic, migrainous in character, or a mere fullness or pressure in the head; weakness, malaise, nervousness and insomnia, joint pains or general body ache, discoloration of skin, subicteroid tinge, blotches or pigmentation; visual disturbances, dizziness and vertigo.

The above symptoms are elicited in a major or minor degree in the average case of indigestion of biliary origin.

Group 2.—History of one or more attacks of pain in the right upper abdominal quadrant, sharp or dull, sticking, colicky or aching in character, sometimes requiring a hypo for relief, with or without temperature; plus some of the above symptoms.

Group 3.—Above group followed by jaundice of various degrees which may be seen in acute and chronic stages.

Group 4. — Persistent symptoms following cholecystectomy.

Group 1 constituted the largest number in our series. Groups 2 and 3 ran a close second and the postoperative sufferers were in the minority.

As regards the sex relationship to cholecystic disease, it is a well-known fact that females are more susceptible to the disease; curiously enough, although we selected the cases at random, there were as many males as females, 366 males and 364 females.

When we consider the etiological factors in the genesis of cholecystitis, the largest number of patients were guilty of faulty habits of diet, overindulgence in food and alcoholics, sedentary habits, irregular meals; sufferers from constipa-

tion, and mental strain. Next in order came obesity and pregnancies, infections from various sources, hyper-susceptibility to colds, hay fever, asthma, and intestinal disturbances. A good many indulged in highly seasoned food and limited their water intake to a minimum quantity.

The age incidence in our series is of interest. The maximum age period ran between 25 and 45, a period best suited for maximum abuse and strain.

We pay high tribute to the teacher who lays stress on a good history as a most essential item in modern clinical medicine. Moynihan once said:

"A good history makes the diagnosis of peptic ulcer certain; it is not necessary to have an x-ray."

We can sometimes apply the same maxim to cholecystic disease. The most characteristic symptom-complex in recurrent dyspepsia of biliary origin was intolerance to fats, excessive sweets, spices and alcoholics; pyrosis was an outstanding annoyance. The saying that there are no perfect rules without exceptions proves of value in this instance. The so-called silent gallbladder without any history of dyspeptic symptoms can exist. We detected twenty-four such cases in our series. They complained of arthritic pains, cardiac and blood pressure disturbances. Forty-four definite gallbladder cases had only mild and vague dyspeptic symptoms. Again, many patients presenting no dyspeptic symptoms did, however, complain of right upper abdominal pain.

We have very little praise for physical examination as a valuable aid in diagnosing chronic cholecystic disease. The majority of dyspeptics of biliary origin present no pathognomonic or characteristic features or signs on physical examination. Occasionally, discoloration of skin and mucous membranes, sensitiveness in gallbladder area on deep palpation, or a palpable liver and distended gallbladder, will be suggestive evidence that the gallbladder is at fault.

If the history and physical examination serve as the frame, the laboratory evidence furnishes the real picture. In this department we must excel and demonstrate our skill. The evidence, direct or circumstantial, must be presented with sufficient clearness for indictment or acquittal.

The contents of an empty stomach, when carefully scrutinized chemically and microscopically, can often sound a warning of the presence of stones, pus, blood and bacteria. Our studies of gastric acidity tend to confirm the accepted belief that gallbladder disease lowers or destroys the hydrochloric acid. This rule is applicable only in uncomplicated cases. When appendicitis, peptic ulcer, or a nervous irritation exist, the acidity was often in excess of normal.

The icterus index was studied in four hundred sixty-one cases; 41.2 per cent had a normal icterus. Still, we believe that an increased icterus index is not necessarily an indicator of cholecystitis, but denotes rather liver function insufficiency.

The information obtained from duodenal biliary drainage is often of inestimable value when carefully performed and scientifically studied. The biochemistry of bile is unfortunately still in the realm of mystery. Blood cholesterol and sedimentation time will be considered by us in a separate paper.

Blood studies reveal that 53.6 per cent of gallbladder cases suffered from anemia. This observation requires further studies and clarification.

The next best laboratory method of approach is the visualization of the gallbladder by x-ray, devised by Graham and Cole in 1926. We were fortunate to have the opportunity of studying the radiographs of every case in association with our other studies and should like to lay stress on the following facts: the preparation of the patient for a cholecystographic study is of paramount importance. The intestinal tract must be emptied well before the dye is administered; the permeability to the drug is thus increased. The patient is given rigid instructions to take the dye two hours after a fatless supper, in small sips while reclining on the right side, consuming one hour in this process; nothing by mouth afterwards until x-ray studies are made. This slow sipping method is of great value in eliminating nausea and vomiting. The gradual and slow absorption materially helps in obtaining a clearer and better visualization. A tabulation of our x-ray findings in the 730 cases is here presented:

	No. Cases	Per Cent
Good absorption and normal emptying	287	39.5
Good absorption and 50 per cent emptying	122	16.9
Good absorption and poor emptying	127	17.4
Faint absorption and emptying of 50 per cent and better	57	7.8
Faint absorption and poor or non-emptying	61	7.9
No absorption	76	10.5
	730	100

Of this number, 69 cases, or about 10 per cent, were found to contain stones.

Gallbladder deformities were observed in 72 cases, or 9.8 per cent. The types of deformity

were horseshoe, mushroom, bilocular, trilocular, and irregular contour.

There was no visualization before a fat meal, but good after the fat meal in 25 cases.

This last phenomenon is of unusual interest and the silence in literature concerning this is surprising. Our explanation of its mechanism is as follows: the gallbladder is filled with thick, inspissated old bile, so that no fresh bile saturated with the dye can enter it. Hence, there is no visualization. Only under the influence of a strong stimulus, such as a quantity of fat in the stomach, does the gallbladder empty itself of old bile and then immediately suck up a fresh quantity of bile mixed with the dye. The visualization then becomes perfect. If calculi are present, they become better visualized; sometimes no shadows can be observed before, but after a fat meal they become discernible. We classify such a gallbladder as chronically diseased. A gallbladder which harbors inspissated old bile becomes an excellent culture tube for bacteria, and bile stasis tends to facilitate the formation of calculi. It is of interest to note that 21 of the 25 cases in this group showed definite gallbladder disease from clinical, surgical, and follow-up studies available.

Not all of the 39.5 per cent of cases with good absorption and normal emptying by x-ray can be classed from a clinical point of view as normal gallbladders. In a number of them, the study of their bile and follow-up of other features compelled us to classify and treat them as cases of digestive disturbance of cholecystic origin. Their symptoms cleared up after treatment.

It would probably be of value to record here our observations in the diminution of the size of the liver after the fat meal, changing thereby the position of the gallbladder. The gallbladder may retain its original size despite the liver's diminution in size.

We laid stress on gallbladder studies by x-ray before barium is given for the study of the gastro-intestinal tract for two reasons: (a) the presence of barium in the intestines prevents good absorption of the dye, and (b) in a number of instances a fairly well visualized gallbladder shadow may be seen on the gastro-intestinal plates twenty-four or forty-eight hours after the gallbladder empties itself of its contents under the influence of fat. The liver evidently retains the dye for twenty-four or forty-eight hours and the refilling of the gallbladder is a normal physiologic act.

Catarrhal nonobstructive jaundice is not a contraindication to the administration of the dye and a fat meal. In fact, beneficial therapeutic results have been observed in some jaundice cases; the swollen liver becomes smaller in size and the patient's condition is thereby improved. However, in cases of hypertensive heart disease with marked arteriosclerosis and renal function impairment, we hesitate to use the dye. Vomiting in such cases might prove disastrous.

While on the subject of cholecystography, it is probably not an unwise suggestion to pay attention to Cassie B. Rose's[2] observation that some normal gallbladders have a very slow absorption and emptying mechanism and more time should be allotted in the study of either function.

Our review would not be complete without a few remarks concerning treatment, both medical and surgical. After a careful study and analysis of findings, each case must be classified according to merits for the proper plan of treatment. We wish to reiterate the note of caution sounded a year ago before this Section, namely:

> "If there is any real doubt about the diagnosis, do not operate, unless you are driven to it. The gallbladder is an important organ, and it should not be removed unless the discomfort it causes is sufficient to justify one of depriving the body of its function."

Never insist on surgical intervention if the patient is steadfastly refusing operation, being afraid of a fatal issue; treat it medically as long as possible, unless you are convinced that medical treatment is valueless.

In our series, the cases operated upon gave 85 per cent confirmatory preoperative diagnoses. The average case of early or moderately advanced gallbladder disease, with few exceptions, does not belong to the domain of surgery; dietary and medical management can frequently accomplish much for the afflicted. The following measures are fundamentally helpful in restoring normal gallbladder and biliary tract function:

(1) Proper hygienic regime: regularity in meals; rest after meals; adequate sleep, and so on.

(2) Outdoor exercise, deep breathing.

(3) Avoidance of constipation.

(4) Frequent small meals for gallbladder drainage.

(5) Bland, non-irritating diet, low in fat to avoid excessive biliary tract stimulation and tendency to hypercholesteremia. High fat diets for stimulating gallbladder emptying when these are not contraindicated by inflammatory condi-

tions or hypercholesteremia. Caloric adjustment for obesity and malnutrition.

(6) Freedom from mental strain, exhaustion and worry.

(7) Removal of foci of infection.

(8) Selected medication: saline, cathartics, sedatives, chologogues, atropin or belladonna, and so on.

(9) Biliary tract drainage.

(10) Application of heat, as by diathermy or warm baths.

(11) Avoidance of alcohol and tobacco.

(12) Alkaline mineral water; liberal intake of water generally and hot water before meals.

The above review probably does not demonstrate any startling new conceptions, but the prime object of our undertaking is to register our observations in a large number of cases with digestive disturbances, presumably of gallbladder or biliary origin. Let the medical profession select and separate the chaff from the grain. Healthy criticism is a welcomed and beneficial means for improvement in present methods of study and treatment of disease of afflicted humanity.

CONCLUSIONS

Blessed is the patient who gives and rewarded will be the physician who takes a correct history in gallbladder disease.

All the methods at our command at present must be resorted to in our efforts to reach a correct diagnosis.

We must not rely upon cholecystography alone except when calculi are present or marked deformity with impairment of function definitely exists.

The fat meal should always be given, even when the first exposures record non-visualization.

Low gastric acidity or achylia, intolerance to excessive grease and fats and pyrosis, even in the absence of pain, speak the language of cholecystic disease.

The average case of early or moderately advanced cholecystitis, minus calculi and evidence of marked disease, is primarily a medical problem.

The outlined plan of medical treatment in suitable cases, persistently urged by the physician and faithfully carried out by the patient, will result in untold blessings.

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DISCUSSION (*Abstract*)

Dr. Julius Friedenwald, Baltimore, Md.—There is no condition which requires more careful study than the dyspepsia of gallbladder disease. As the speaker has pointed out we have come nowadays to rely too often upon visualization of the gallbladder alone as a means of diagnosis, neglecting other signs and symptoms which may be of great significance, for associated conditions may have a far more important bearing upon the patient's condition than is indicated by the mere delay in gallbladder emptying. While chronic cholecystitis and cholelithiasis frequently give rise to characteristic acute attacks pointing directly to the presence of these affections, there are many instances of atypical manifestations in which the correct diagnosis becomes obscure. It not uncommonly happens that many of these cases present histories of dyspepsia of a rather chronic though mild type with an absence of acute attacks of colic and jaundice and without other direct evidences of gallbladder involvement.

The patient of this type should be studied from every point of view. A clear and complete history is often of the greatest importance and may in itself accomplish more in pointing to the correct diagnosis than any of the other studies. In the visualization of the gallbladder, a delay in emptying, as Dr. Levin has shown, need not necessarily indicate the presence of a cholecystitis; while even the direct evidence of the presence of calculi may not in itself signify the actual cause of the patient's complaint. In order that no direct evidence in diagnosis be overlooked, it is extremely important, especially when acute attacks are absent, that a regular routine in the examination be followed. Cholecystitis or cholelithiasis may be divided into two types: (1) those in which attacks of gallstone colic continue for years with a gradual onset of chronic dyspepsia; and (2) those in which chronic dyspepsia with milder attacks of acute indigestion occurs often followed finally by biliary colic.

According to our experience the presence of gallbladder dyspepsia may ordinarily be suspected if a thorough clinical history is obtained. Not infrequently the patient will be reminded of attacks of early acute abdominal pains, some of which may have perhaps required anodynes for relief and some may have been accompanied at times with jaundice or will present histories of early infections such as typhoid fever. Preceding or following such attacks, dyspepsia of a chronic though milder type has been noted with periods of relief extending over months or even years. The dyspeptic symptoms manifested are fullness, pyrosis, weight and distention following meals, though at times without relation to food, which may or may not be accompanied by discomfort in the epigastrium and under the right costal arch. These symptoms are frequently relieved by eructations or by means of carminatives. It is not uncommon for these paroxysms to occur just upon retiring, causing such distress as to require the patient to sit erect in bed for hours, producing forcible efforts at eructations. Pain is often noted following

meals, extending around the upper abdomen, especially in the region of the right hypochondrium. It may occur as the hunger type reaching its greatest intensity three or four hours following meals, though this is not constant, and relief is ordinarily not always afforded by means of food or alkalis. Indigestible food is apt to aggravate this condition. Tenderness on pressure in the region of the gallbladder is not uncommon, though this sign is by no means constant. Nausea and vomiting occur at times. These symptoms are ordinarily not severe and may continue for years, often with periods of relief following careful dieting or medical treatment, recurring at irregular intervals for shorter or longer periods, especially following indiscretions in diet or upon over exertion.

While these forms of gallbladder infections are ordinarily diagnosed without difficulty by the history of acute attacks as well as by the tenderness elicited under the right costal arch, notwithstanding the rather indefinite gastric symptomatology, other forms of cholecystitis occur in which the diagnosis is very uncertain and obscure.

In this group are certain cases classified under the term biliousness. These patients are sallow in appearance, weak, affected with indigestion and constipation, and are the subjects of sick headaches and migraine attacks, with temporary slight enlargement of the liver. In a small group of such cases severe types of biliary stasis with chronic cholecystitis exist due to the presence of an atonic, infected gallbladder.

In certain affections of the gallbladder, notably in cholecystitis and cholelithiasis, pylorospasm is produced, resulting in epigastric pain with symptoms of hyperacidity. The condition may in consequence simulate gastric or duodenal ulcer or chronic appendicitis and, on this account, the diagnosis may thus be rendered extremely doubtful. Further, difficulty also arises from the possibility that the two conditions may be present in the same patient. In some cases dysphagia is a prominent symptom, due to reflex spasm at the cardia.

In another group of cases no history of severe attacks is presented, but only a grumbling gnawing sensation relieved by food and by alkalies with an associated hyperacidity.

In still a further type a septic temperature is observed of a greater or lesser severity with slight gastric disturbance or pain. The temperature may continue with morning remissions and an evening rise for a considerable period of time until perhaps the true condition is revealed by a sudden onset of an acute attack of gallbladder colic.

Finally, in another type which markedly simulates angina pectoris, or even coronary thrombosis, pain is noted in the precordium, radiating into the arm. There is often present in these cases considerable gaseous distention of the stomach with eructations not uncommonly of the aerophagic type. In consequence, such patients are not infrequently treated for angina pectoris until an enlargement of the liver with tenderness under the right costal arch with perhaps a mild fever will point to the true nature of the affection. In a considerable number of these cases gallbladder operation is followed by complete recovery. In many of the obscure cases of cholecystitis accompanied with gastric dyspepsia in which the diagnosis remains doubtful, the correct solution may be arrived at by means of gallbladder visualization.

As Dr. Levin has pointed out, in order to obtain the best results from this method of examination the technic must be meticulously carried out. The observation has likewise been confirmed by us that in spite of a normal visualization, the presence of a cholecystitis may be occasionally proven to exist by other methods of investigation. Non-surgical biliary drainage according to the Lyon method has also been of the greatest value in our experience in revealing direct evidence of infection in certain obscure instances of gallbladder disease.

According to our studies, achylia gastrica is present in from 20 to 25 per cent of these cases, while in from 25 to 30 per cent hyperacidity is observed. The association of achylia with pain or discomfort is rather indicative of organic disease, so that this finding may be of some value in diagnosis in certain obscure cases of gallbladder dyspepsia.

In conclusion, it is evident that there are various types of gallbladder dyspepsia in which the typical manifestations of this affection are absent and in which the diagnosis remains extremely obscure. In many of these instances, a history of former acute attacks of upper abdominal pain may aid in arriving at correct conclusions. In some cases the diagnosis may, however, be cleared up by means of roentgen ray visualization, while in others help may be obtained by means of duodenal drainage, and special blood chemistry studies. There still exists, however, a small, but nevertheless definite group of cases in which the diagnosis remains so obscure that only after prolonged clinical observation or even surgical intervention, can a correct conclusion be reached.

Dr. Seale Harris, Birmingham, Ala.—In making the diagnosis of gallbladder disease the anamnesis is of greatest importance. Indeed, in a considerable proportion of cases, careful history taking will elicit sufficient data upon which to base a diagnosis of chronic cholecystitis. In other words, the general practitioner, without the aid of an x-ray or laboratory, can make a positive diagnosis of gallbladder disease in the majority of cases. While the Graham-Cole test, in the hands of expert roentgenologists may be depended upon in perhaps 90 per cent of cases of chronic gallbladder disease, in the other 10 per cent it may be misleading. For instance, a former patient of ours, a pronounced psychoneurotic, was examined by a group of excellent internists who suspected gallbladder disease. The Graham-Cole test was positive in that the gallbladder was not visualized. An operation was advised and when he was examined by the surgeon the man was in such a highly nervous state that it was thought best to defer the operation for two or three months. He returned for examination after a rest in the mountains, where he had no symptoms, and the Graham-Cole test then showed a perfectly normal outline of the gallbladder. Unquestionably emotional disturbance and fatigue may affect absorption of the dye and its concentration in the liver and gallbladder. The non-visualization of the gallbladder after the ingestion of the dye should not condemn a patient to operation, even if he has had unmistakable symptoms of cholecystitis. We have had a number of cases in which a positive diagnosis of gallbladder disease was made, and in which there was non-visualization of the gallbladder in the Graham-Cole test. After two or three months of proper dieting and with the use of the duodenal biliary drainage (the so-called "non surgical gallbladder drainage") the symptoms have sub-

sided and the Graham-Cole test has shown a normal functioning gallbladder. It is an interesting fact that the high carbohydrate-low fat diet, which gives such good results in diabetes, is the diet best suited for gallbladder disease. This brings up the relationship of gallbladder disease to diabetes. Joslin, in particular, is impressed by the frequency of their association of the relationship if the common duct and the pancreatic duct are remembered, it would seem that, if there is inflammation of the one, there is likely infection of the other. It should be remembered also that in chronic cholecystitis there is usually hepatitis and no doubt pancreatitis is frequently associated. In other words, the same infection that causes a chronic cholecystitis and hepatitis, may travel by continuity through the pancreatic duct to the pancreas causing the pancreatitis that precedes diabetes. Recently several cases of gallbladder disease have been found associated with hyperinsulinism, the opposite condition to diabetes, a disease that may result from pancreatitis. It certainly is worth while to make blood sugar studies on gallbladder patients, who are potential diabetics, and the adult chronic diabetic, in whom there are digestive symptoms, should have a cholecystogram. We are so impressed with the relationship of gallbladder disease to diabetes that we intend making cholecystograms as a routine in our diabetics above the age of forty.

PATENT URACHUS*

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Among the several possible urachal anomalies, probably the one which is most rarely observed clinically is that known as patent urachus.

In the course of nearly four centuries following the original observation of the condition little more than one hundred and fifty cases have been recorded in the medical annals of the entire world.

In his admirable study of the anatomy, histology and development of the urachus in the human embryo, Begg[1] traces its derivation in common with that of the upper part of the bladder from the ventral cloaca, the portion of the bladder in question becoming progressively narrow as it gradually develops, though all the while preserving on a small scale its original structure, and remaining attached to the umbilicus at birth. It is estimated that in approximately two out of three individuals the lumen of the urachus is separated from the bladder itself by an interposed partition of thin mucous membrane, while in the third instance this partition fails to develop, the lumen remains open, either completely or partly, and the condition which thus results is called patent, patulous, or persistent urachus.

Various schemes for the classification of disturbances of obliteration of the urachus have been proposed, one of the earliest and perhaps the best of them by Vaughan,[5] who in 1905 in his comprehensive monograph on the subject distinguished four types, namely: (a) the complete, the duct being open all the way and forming a continuous communication between the bladder and the outside of the body at the navel, (b) the blind internal, the navel remaining closed, and the duct communicating with the bladder, (c) the blind external, the communication with the bladder being closed, and the navel end of the duct remaining open, and (d) the blind, both ends being closed, and the duct remaining open in the middle. Douglass[3] subsequently described two conditions dependent upon mode and extent of obliteration of the urachus, one of complete persistence, marked by congenital urachal fistula, actually undescended, or incompletely descended bladder with leakage of urine at the umbilicus through its tip, the urachus; the other condition, one in which the urine may escape through the unobliterated terminal end of the urachal canal, this being occasionally quite small, though even so leading to abscess formation in the prevesical space or in the abdominal wall below the umbilicus. Rieder,[4] in his turn, divided interference with obliteration of the urachus into those in which the urachus is partly open and those in which it is completely patent, the former group including urachal cysts, closed in the direction of umbilicus and bladder, and urachal diverticula, and the latter group urachal fistulae, in which umbilicus and bladder are connected by a permeable tract. While other analogous classifications have been from time to time suggested, only the principal proposals have been considered here.

A study of the sex incidence in the material involved in the present survey reveals the preponderance of the condition in males in the approximate ratio of two to one. With respect to age of patients, when congenital the anomaly is practically always discovered at birth, or soon after separation of the umbilical stump. However, it should be remarked here that urachal fistula which occurs later in life, sometimes even at an advanced age, is probably attributable to a persistent urachus of congenital orgin which

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TABULATION OF CASES OF PATENT URACHUS

Author	Year	Age	Sex	Co-Existing Pathologic Condition	Type of Operative Procedure	Remarks
Cabrol	1550	18	F	Obliteration of urethral meatus; umbilical tumor	Reestablishment of flow of urine; umbilical suture	Recovery
Littre	1701	12	F	Obstruction of neck of bladder by "fungous flesh"	———	Autopsy
Caulton	1752	....	....	.....	.....	.....
Caulton	1757	32	M	Small umbilical tumor	———	Claim of ability to urinate at will via penis or umbilicus
Petit	1774	—	F	———	———	No details
Marx	1810	2	M	Red tumor of umbilicus at birth; pus with dropping of cord	Compression	Cicatrization in six weeks; persistence of fistula
Velpeau-Roux	1825	2	M	Congenital tumor of umbilicus	Compression	Complete failure of treatment
Roux	1826	Not given	M	Congenital fistula with imperforation of urethra	Not given	———
Marx	1827	23½ mos.	M	Oblong pendant umbilical tumor	Compression	Recovery
Holscher	1839	25	M	Almost complete atresia of urethra	———	Apparent recovery
Meyer	1844	1	M	Peniform umbilicus with orifice similar to urethral meatus	Operation refused	Normal micturition via urethra
Starr	1844	13 wks.	F	———	Simple suture	Recurrence after 2 weeks
Cabell	1848	15	F	Small umbilical tumor	———	Untreated
Paget	1850	40	M	Dysuria; calculus in urachus and bladder	———	No interference with congenital defect
Keller	1852	4 days	M	———	Compression	Recovery
Bryant	1862	8	M	Peniform umbilical tumor with an orifice corresponding to the urethra at its extremity	———	Offer of treatment refused
Smith	1863	2	M	Congenital fistula (unobstructed), with umbilical tumor	Ligature of tumor	Recovery
Graf	1864	28	M	Carcinoma of urachal mucosa	———	Caustic treatment at birth; appearance of tumor 25 years later
Townsend	1866	5 days	M	Orificial ulceration of urachus	———	Cauterization; apposition; cure
Annandale	1870	39	M	Abnormally small urethra	———	Operation refused
Hoffman	1870	25	M	Carcinoma of urachus	———	Congenital fistula cured by caustic; autopsy: persistence of urachus
Gueniot	1872	10½ mos.	M	Cherry-like umbilical tumor	Successive ligatures	Cure of fistula, but four months later umbilical hernia
Alric	1873	5	M	Pedunculate umbilical tumor	Extremely tight double ligature	Recovery
Wolff	1873	28	F	Umbilical cancer	Reopening of fistula	Death from peritonitis
Charles	1875	1	M	Phimosis	Circumcision	Recovery
Jacoby	1877	18	M	Recent umbilical fistula following retention of urine	Introduction of heated sound into fistulous tract	Recovery
Rose	1877	11	M	Umbilical tumor size of turkey egg	Ablation	Recovery
Vosburgh	1877	50	M	Round umbilical tumor containing urinary calculus	Incision; removal of calculus	Recovery
Cadell	1878	8	F	Protuberant umbilicus	———	Autopsy: vesical capacity markedly reduced by the thickness of walls
Levie	1878	79	M	Prostatic hypertrophy	———	Simultaneous appearance of fistula and prostatic disease

TABULATION OF CASES OF PATENT URACHUS (*Continued*)

Author	Year	Age	Sex	Co-Existing Pathologic Condition	Type of Operative Procedure	Remarks
Lugeol	1880	2wks.	M	Small umbilical tumor	Light compression	Recovery
Ratimoff	1880	—	—	———	———	Cites only cases of others
Terrillon	1881	Not given	M	———	———	New born infant; cauterization; cure
Ashhurst	1882	9 mos.	M	Umbilical tumor size of filbert	Ligature of umbilical tumor	Recovery
French	1882	6 wks.	F	Peniform umbilical tumor	Ligature; excision	Recovery
Ball	1883	8	M	———	Plastic closure of fistula	Death from peritonitis
Garrard	1884	5 mos.	Not given	Strawberry-like umbilical protrusion	Ligature of protruding portion; closure of orifice by quilled and superficial sutures	Recovery
Waller	1885	5 mos.	M	Inflamed, extremely sensitive umbilical tumor	Dissection of urachus; ligature	Recovery
Bramann	1887	12	F	Cystitis	Suture	Result unknown
Freer	1887	3mos.	M	Umbilical tumor	———	Operation refused
Freer	1887	5 mos.	M	Strawberry-like umbilical tumor	Subcutaneous ligature; excision	Recovery
Penny	1888	11 mos.	M	Umbilical tumor size hazel nut	———	Operation refused
Pierre	1388	Not given	M	———	———	———
Willard	1888	2	F	———	Suture of umbilicus; recurrence at end of month: reopening, curettage; cauterization	Recovery
Vanderveer	1889	20	F	———	Ablation of urachus; curettage; suture	Recovery
Kirmisson	1890	4 mos.	M	Umbilical tumor	———	Death
Pratt and Bond	1890	54	M	Enormous urachal cyst	Abdominal section; division of cyst; closure of incision with drainage	Recovery
Delageniere	1892	5½	M	Congenital umbilical tumor	Excision; resection; suture of urachus	Recovery
Delageniere and Persy	1892	7	F	Small umbilical tumor	———	Cauterization without result
Van Hook	1894	5 mos.	F	Subumbilical protrusion; cystitis	Dilatation of fistula with drainage	Recovery
Forgue and Morer	1895	20	M	———	———	Untreated
Epstein	1896	9	M	Enuresis nocturna	———	Report of observation
Chapin	1897	66	M	Prostatic hypertrophy	———	———
Jaboulay	1897	62	M	Hypertrophy of prostate	Ligature of urachus	Reestablishment of fistula
Renasen	1897	6	F	Small umbilical tumor	Omphalectomy	Recovery
Stierlin	1897	12	F	Protuberance along white line	Ablation	Recovery after repeated cauterizations
Trogneux	1897	8	M	Pyuria; tuberculous cystitis	Ligature of urachus after omphalectomy; self-retaining urethral catheter	Reestablishment of fistula in ten days
Delore and Molin	1898	30	M	———	———	Report of observation; no details
Doran	1898	2	Not given	Polypous excrescences of bladder	Puncture	Autopsy
Lexer	1898	20	M	Umbilical infection	Irrigation; excision of urachus; suture	Recovery
Lexer	1898	67	M	Prostatic hypertrophy	Slitting up of urachus; iodoform gauze packing; introduction of permanent catheter	Death in 14 days from uremia
Lexer	1898	1½	M	Meckel's diverticulum; congenital phimosis	Abscission of the diverticular sheath; closure of fistula	Recovery

TABULATION OF CASES OF PATENT URACHUS (*Continued*)

Author	Year	Age	Sex	Co-Existing Pathologic Condition	Type of Operative Procedure	Remarks
Preston	1898	Not given	M	Complete absence of sexual organs; neoplasms above and below umbilicus	———	Report of observation; no other details
Garrigues	1899	45	F	———	———	Autopsy
Kennedy	1899	7 mos.	M	Pedunculated umbilical tumor	Ligation of pedicle	Recovery
Monod	1899	10	M	Phimosis	Double elliptic incision; dissection and isolation of urachus; section close to bladder; suture	Recovery
Briddon	1900	19	F	Red tumor size of pea in umbilical region; tubercular degeneration of urachus	Resection of urachus at its point of junction with bladder	Recovery
Jahn	1900	5	M	Umbilical protuberance (peniform)	Periumbilical incision; dissection and resection of urachus	Recovery
Reid	1900	25	F	Umbilical pain and swelling; later discharge of pus	Bladder incision; destruction of lower part urachus by actual cautery; closure of bladder with drainage	Recovery
Unterberger	1900	23	F	Retroversioflexion (partial incarcerated) of gravid uterus	———	Recovery following delivery
Imbert	1901	6	F	?	Resection of fistulous tract close to bladder; suture	Recovery
Roorda Smit	1901	58	M	Impermeable stricture	High puncture of bladder; later urethrotomy	Recovery
Roorda Smit	1901	17	F	Blood via umbilicus during menstruation	Edges of fistula split; purse-string suture	Recovery
Roorda Smit	1901	1½	M	Eczematous umbilicus; marked phimosis	Omphalectomy	Recovery
Griffith	1902	5 mos.	M	———	———	Approximation of edges with plaster; recovery in 3 months
Hind	1902	6	F	Abscess in patent upper part of urachus	———	Spontaneous external discharge; inflammatory obliteration of tube; cure
Hind	1902	4	F	———	Urachus ligated and removed like vermiform appendix	Recovery
Hind	1902	Middle aged	M	Irritable bladder, with pain over pubes and pollakiuria	———	Recovery following passage of pus from bladder through urethra
Hind	1902	5 wks.	M	Inflammation due to periumbilical extravasation of urine	———	Death
Pauchet	1902	5	M	———	Resection of urachus close to bladder and pursestring suture of dome without opening peritoneum	Recovery
Yates	1902	3 wks.	M	Umbilical protuberance through which urine was voided	Pursestring suture and abscission of protrusion	Recovery
Guisy	1903	60	M	Urethral stricture	External urethrotomy; removal of two large gravels from behind stricture	Recovery
Guisy	1903	32	M	Urethral stricture	Internal urethrotomy; dilatation	Recovery
Stites	1903	9 mos.	F	Mass of granulation tissue (opening in center) in place of navel	———	Cure through repeated cauterization at intervals
Matthias	1904	48	M	Abundant urethral discharge; subumbilical tumor	Extirpation of tumor	Recovery
Patel	1904	3	M	Subumbilical fusiform tumefaction	Puncture and suture of walls of sac	Recovery

TABULATION OF CASES OF PATENT URACHUS (*Continued*)

Author	Year	Age	Sex	Co-Existing Pathologic Condition	Type of Operative Procedure	Remarks
Stevens	1904	17	M	Herniated, eczematous umbilicus	Excision of urachus; closure of lower end communicating with bladder by pursestring suture; inversion as with vermiform appendix	Recovery
Swirt	1904	58	F	Retention of urine in addition to dribbling from navel	Establishment of vesicovaginal fistula followed by spontaneous closure of urachus	Subsequent closure of fistula
Swirt	1904	17	F	Constant dribbling of urine from navel and of blood during menstruation	Splitting of edges of fistula and insertion of pursestring suture	Recovery
Swirt	1904	1½	M	Marked phimosis	Circumcision ineffective; excision of navel and closure of urachus with pursestring suture	Recovery
Hue	1905	15	M	Nocturnal urination via umbilicus	———	Report of observation; no other details
Lannelongue	1905	3 mos.	M	Umbilical hernia and opening of urachus at dropping of cord	———	Death
Tuholske	1905	52	M	Recurrence of infantile patency of urachus at 48	Extraperitoneal splitting down and sewing across of urachus	Recovery
Vaughan	1905	40	M	Pouch-like dilatation of patent urachus with infection of contents; renal calculi	Extirpation of urachus	Recovery
Binnie	1906	15	F	———	———	Cauterization; closure; cure
Kubinyi	1906	20	F	Three months' pregnancy	Extraperitoneal excision of the urachus	Recovery
Draudt	1907	6 mos.	M	Phimosis	Dissection, resection of the urachus; closure of abdomen	Recovery
Draudt	1907	New born	M	Partial imperforation of urethra	Perineal urethrostomy	Death on fourteenth day
Marshall	1907	43	F	Complete procidentia uteri	Dissection and removal of urachus as far as its connection with the bladder	Recovery
Erdmann	1908	4	M	Umbilical tumor size of mushroom	Dissection, resection of urachus; excision of umbilicus; suture and inversion as with appendicular stump; vesical sound for 3 days	Healing on seventeenth day
Florentin	1909	4	F	Umbilical tumor size of large pea	Excision	Recovery
Dykes	1910	30	M	Encysted urinary calculi	Litholapaxy; lateral lithotomy	Recovery
Bonzani	1911	20	M	Subumbilical tumor of size of hen's egg	Extirpation of umbilical cicatrix and tumor	Recovery
Huggins	1911	10 days	Not given	———	———	Repeated cauterizations; cure
Reed	1911	Not given	F	Fibroid of uterus	———	———
Andre and Boeckel	1912	16	M	Totally permeable urachus	Subperitoneal extirpation	Recovery
Brown	1912	31	F	Non-fluctuating subumbilical tumor the size of an orange	Incision of tumor; removal of one-third of bladder; closure of bladder with double row catgut sutures	Recovery
Lebedev	1912	12 mos.	M	Cryptorchidism; umbilical hernia	———	Report of observation
McGehee	1912	21	M	Marked tumefaction in umbilical region	Removal of section of abdominal wall, mesocyst, and urachus at level of bladder; invagination of bladder opening; usual closure of abdominal incision	Recovery
Pearse and Miller	1912	27	F	Hematuria; abdominal tumor; tuberculosis of urachus	Resection	Recovery
Peraire	1912	31	F	Eventration	Double ligature and resection of urachus	Recovery

TABULATION OF CASES OF PATENT URACHUS (*Continued*)

Author	Year	Age	Sex	Co-Existing Pathologic Condition	Type of Operative Procedure	Remarks
Gerster	1913	52	M	Epigastric hernia	Hernial contents replaced; navel severed from top bladder below skin; inversion under three tiers catgut sutures	Recovery
Mitchell	1913	New born	M	Small umbilical tumor; slight phimosis	.....	Normal micturition after 3 months' cauterizations with nitrate of silver
Burckhardt	1914	Not given	Not given	Umbilical hernia	Extirpation urachus; reduction of hernia	Recovery
Monceau	1914	18	F	Spontaneous obliteration of congenital umbilical fistula; urine via umbilicus fourth month in pregnancy	Resection of urachus after confinement with opening of peritoneum; suture of opening into bladder	Recovery
Eastman	1915	19	F	Primary tuberculosis of urachus	Free dissection of fistulous tract	Recovery
Cifuentes	1916	58	M	Large hypogastric tumor	Extirpation of urachus	Death from peritonitis
Gibb and Glassberg	1917	74	M	Hypertrophy of prostate; urachal abscess	Evacuation of abscess; enucleation of prostate	Recovery
Gibb	1918	74	M	Dysuria followed by umbilical fistula	Suprapubic prostatectomy; drainage of bladder for twenty-one days	Recovery
McNealy	1920	37	M	Swollen, indurated area around umbilicus	Resection; stump inverted with pursestring suture	Recovery
Powell	1920	9 mos.	M	Abscess	.....	
Klopp	1921	50	M	Intramural urachal sarcoma	Excision of umbilicus	Recovery
Pied	1923	2 wks.	F	Congenital umbilical hernia	Radical hernia operation	Recovery
Alevoli	1925	34	F	Salpingo-oothecitis	Partial resection of cystic urachus	Recovery
Dailey	1925	2½	F	.....	Ligatures	Recovery
Dambrin and Trouette	1926	24	---	.....	Pursestring closure of umbilicus; resection of urachus; inversion of vesical stump	Recovery
Davey	1926	32	M	Meckel's diverticulum	Excision of diverticulum and urachus	Recovery
Davis and Niehaus	1926	1	M	Persistent omphalomesenteric duct	Resection; stump inverted with pursestring suture; artery tied off; raw surface inverted with pursestring suture	Recovery
Rankin and Parker	1926	26	F	Intense cystitis; discharge of pus and of blood from umbilicus; umbilical cyst	Excision of umbilicus and permeable urachus	Apparent recovery
Van Hook	1926	18	M	Acute appendicitis with perforated (localized) peritonitis	Resection of umbilicus and upper end of urachus; appendectomy	Recovery
Brown	1927	48	F	Chronic diffuse cystitis; ulcer of bladder	Excision of urachus and section of bladder wall containing ulcer	Recovery
Mraz	1927	15	F	Double uterus and double vagina; persistence of fetal type of bladder	Kelly operation	Recovery
Diaca	1928	11	M	.....	Incision of adherent peritoneum; isolation, ligation and section	Recovery
Diaca	1928	16	M	.....	As above	Recovery
Diaca	1928	20	M	.....	Ligation and resection; close of bladder	Recovery
Slovacek	1929	35	M	Concomitant urachal lithiasis (urates)	Extirpation of urachus	Recovery
Auslander and McClure	1930	2 wks.	F	Umbilical herniation; patent omphalomesenteric duct	.....	Autopsy

TABULATION OF CASES OF PATENT URACHUS (*Concluded*)

Author	Year	Age	Sex	Co-Existing Pathologic Condition	Type of Operative Procedure	Remarks
Cohn	1930	43	M	Small umbilical hernia	Resection; stump inverted with pursestring suture	Recovery
De Geus	1930	New born	F	Ectopic bladder	Compression	Recovery
White and Holm	1930	66	M	Prostatic hypertrophy	Resection; prostatectomy	Recovery
Colby	1931	78	M	Prostatic hypertrophy; marked pericystitis with abscess formation	———	———
Duclaux and Blondin	1932	6 wks.	M	Infection of urachal canal (Staphylococcus aureus)	———	Repeated cleansing of fistulous tract; recovery
Smoler	1932	35	M	Urachal diverticulum containing large concrement	Resection; removal of stone from bladder; inversion of defect (catgut sutures)	Recovery
Wassiljew	1932	11	M	Piriform protrusion in pubic region	Excision, partial suture urinary bladder; drainage	Recovery
Douglass	1933	51	F	Hernia of operation scar involving urachus	Division and ligation of the urachus; herniorrhaphy	Recovery
Douglass	1933	32	F	Tuberculosis of cervix	Exploratory laparotomy	———
Mast, Streamer and Unfug	1933	45	M	Bleeding papilloma; slight prostatic hypertrophy	Removal of tumor; closure of bladder about a rubber drain	Recovery
Rieder	1934	New born	M	———	Excision	Recovery
Stoian, Dragomirescu and Botez	1935	22	M	———	Ligation and resection	Recovery
Wilmoth	1936	19	M	———	Excision	Recovery
Wilmoth	1936	27	M	Urachal cyst	Excision	Recovery
Wilmoth	1936	38	M	———	———	Operation declined
Wilmoth	1936	31	M	Tumor mass extending from umbilicus downward to pubis	———	Inoperable
Mahoney and Ennis	1936	1 mo.	M	———	Crushing, ligation, excision by actual cautery; stump buried; pursestring suture	Recovery
Herbst	1936	6	M	Fibroma	Excision	Recovery

escaped attention during the immediate postpartum period. Moreover, as Colston points out, in the blind type secretory activity of the membrane lining the canal may produce a urachal cyst at any age, thus revealing the presence of an unsuspected patent urachus. Again, although usually congenital, complete patent urachus may be acquired in consequence of the rupture of the closed end in one of the blind types. Apparently the oldest patient with acquired pervious urachus whose history has been recorded was a man of 79 suffering from prostatic hypertrophy, in whom following prolonged retention the urine suddenly burst through the navel, while the youngest patient with acquired patent urachus was a male child of six months.

Presumably the credit for the original observation and description of the condition is due to one Bartholomaeus Cabrolius, who in his "Alphabet anatomique" reported a case in a woman of 18, on whom in the year 1550 he performed an operation for reestablishment of the normal channel of flow of urine, the procedure employed by him consisting in ligation of the umbilical protrusion and dilatation of the urethra. However, not until a hundred and fifty years later was another case recorded, this time by Littré in 1701, his patient having been a girl of 12, the neck of whose bladder was, as he expressed it, obstructed by "fungous flesh." Between this and the third published account there was an interval of well over a century, when in 1810 Marx contributed the history of a case in a male child of 2 years, who at birth exhibited a reddish tumor of the umbilicus, with appearance of pus following dropping of the cord, in whom treatment by simple compression resulted in six weeks in cicatrization and persistence of fistula. From that time onward, cases began to be reported with ever-increasing frequency, although the

great bulk of the literature on the subject has appeared only during the last one hundred odd years, that is to say, from 1825 to the present.

Altogether an approximate total of one hundred and forty-eight cases has been reported. In these cases the apparent ratio between the congenital and the acquired form is roughly as 5 to 4, this estimate being based entirely and necessarily upon the indication in the history of the time of the manifestation of the phenomenon. One hundred and eight cases occurred in males and forty-four in females. In the group of acquired cases, the average age was found to be 23 years.

Coexisting pathology, where present, included among its prominent features (a) umbilical tumors, noted in thirty-four cases, pedunculated in two and peniform in four; (b) umbilical hernia, in seven cases; (c) hypertrophy of the prostate, in six cases; (d) phimosis, in five cases; (e) urachal cancer, in three cases; (f) Meckel's diverticulum, in three cases; (g) urachal diverticulum, in three cases; (h) urethral stricture, in two cases; (i) cystitis, in two cases; (j) urachal cyst, in one case; and (k) urachal lithiasis, in one case.

The diverse methods employed in the treatment of the condition comprised:

(1) Extirpation of the urachus, usually with after-treatment as in excision of the vermiform appendix, with 47 recoveries, 1 death, and 1 recurrence.

(2) Ligation or suture alone, with 9 recoveries, 1 failure, and 2 recurrences, one of them in childhood.

(3) Removal of obstructions to normal flow of urine (phimosis, vesical stone or tumor, prostatic hypertrophy, urethral stricture), with 8 recoveries, 1 death, and 1 failure.

(4) Cauterization, actual or chemical, of umbilical orifice, with or without ligature and suture, with 7 recoveries, 1 death, 1 failure, and 1 recurrence in adulthood.

(5) Removal of stone and other sources of irritation from the urachus, with 4 recoveries.

(6) Simple compression, with 4 recoveries and 2 failures.

(7) Slitting and packing of the urachus, with 3 recoveries and 1 death.

(8) Plastic closure of the urachus, with 1 death.

In cases not included in the above figures of the results from treatment, and numbering fifty-two out of the total of one hundred and forty-eight, operation was refused in one, and no precisely classifiable data relative to mode and outcome of therapy were found in the histories of the others.

The following is the history of a case of congenitally patent urachus complicated by a bladder fibroma, treated by the writer:

J. B., a colored male child of 6, was readmitted to Gallinger Municipal Hospital in Washington on March 27, 1935, complaining of pain, swelling of the face and forehead, nocturia (one or two times), and a draining umbilicus. The mother related that the umbilicus bled more than usual after a normal delivery, and that the child was treated for a bleeding urachus twenty-six days after his birth, and, further, that the navel had always appeared larger than the normal and was strapped frequently. Two years previous to readmission the child commenced to soil his clothing around the umbilicus, especially at night, and was in March, 1933, admitted to Gallinger Municipal Hospital for treatment of the condition, which strapping appeared to improve. According to the mother, there had since been occasional soiling of clothing, which had recently become somewhat more extensive.

Physical examination at the time of readmission revealed frontal cellulitis. A draining sinus resembling a patent urachus was seen at the umbilicus. There was slight rectal diastasis. On March 8, 1935, the urine was acid, with a specific gravity of 1.022, and contained a few pus cells. The leukocyte count was 10,500. On April 1, 1935, the Kahn test was reported negative. On April 3, 1935, a cystogram demonstrated an apparently normal bladder which filled satisfactorily. No urachus could be visualized. On the injection of 125 c. c. of 6 per cent sodium iodide the solution appeared at the umbilicus. On April 8, 1935, roentgenograms taken after the urachus was injected with iodized oil showed only a small amount of oil in the urachus, the remainder having passed into the bladder. On April 9, 1935, cystoscopy revealed a bladder normal with the exception of a pouch-like extension in the left vault, through which it was impossible to pass a catheter. Just superior to the internal sphincter there was a small and apparently smooth tumor of approximately one centimeter in diameter.

On April 11, 1935, an operation was performed for the relief of the condition. The urachus was dissected out with considerable difficulty and the perineal cavity was entered to assist in localization of this projection from the bladder. Great difficulty was experienced in entering this tract, which was finally completely excised, and the bladder closed at the time of operation. The small fibroma was excised and two interrupted sutures taken to repair the bladder wall. The report from the laboratory was as follows: The tumor consists of a small mass of fibrous connective tissue covered with transitional epithelium. While histologically benign, this tumor may recur if not completely removed. The patient was discharged on May 4, 1935, after an uneventful convalescence.

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DISCUSSION (*Abstract*)

Dr. Edgar G. Ballenger, Atlanta, Ga.—I have never seen a patent urachus. Our search for this condition, though, as a source of pus in patients with obscure pyuria has led at times to the finding of rare and unusual causes of pus in the urine.

Dr. Russell Hennessey related to me the history of a patient in whom he thought at first that the cause of pyuria was a patent urachus. Further studies showed, however, that the origin of the pus was a vesico-appendical fistula. An abscess of the appendix had ruptured into the bladder.

In one of my patients persistent bladder symptoms were at first thought to be due to a patent urachus because of the "inverted top" appearance of the cystogram. It was found, however, that the trouble was due to multiple small stones in the prostate.

Dr. H. King Wade, Hot Springs, Ark.—In the review of the literature on "patent urachus" the work of Begg is outstanding. It was his conclusion that the urachus is the modified upper end of the fetal bladder. At the time of birth the urachus reaches the umbilicus, but shortly after birth the bladder descends, taking the urachus with it. It usually measures 8 mm. at its attachment to the bladder and tapers to 1 mm. at the apex. It extends upward from the anterior border of the bladder for a distance of 5 cm. and lies between the transversalis fascia and the peritoneum. It is a musculo-tendonous structure, hence aids in taking up the slack during the expansion and the contraction of the bladder. Begg has demonstrated that the epithelial lining of the lumen of the urachus persists throughout life. In about two-thirds of the individuals the lumen is separated from that of the bladder by a thin partition of mucous membrane and in the remainder there is no partition and the cavities communicate.

White and Holm describe the various urachal anomalies. There are those in which no communication exists between either the bladder or umbilicus in which urachal cysts may form. The lower end of the urachus may remain closed and the upper end remain patent, and in such a case there may be a more or less continuous discharge of mucopurulent material from the umbilicus. There are other cases in which the bladder remains attached to the umbilicus and a discharge of urine occurs through the umbilicus. This is believed to be the case in all congenital vesico-umbilical fistulae.

In the acquired vesico-umbilical fistula a different mechanism exists. If a direct communication exists between the bladder and urachus, increased intravesicular pressure may cause a dilatation of the urachus. Such a pressure may occur in children from congenital urethral obstruction or vesicle calculus; in the adult, from prostatic hypertrophy, urethral stricture or calculus. If the pressure on the dilated urachus continues, there occurs an extrusion of urine through the urachal wall and surrounding tissue, the urine passing upward to the floor of the umbilicus, through which it forces an opening, resulting in the acquired vesico-umbilical fistula.

Begg, up to 1927, reported fifty-eight cases of acquired vesico-umbilical fistulae associated with patent urachus. Thirty-nine were under the age of 6 years and three were over 45. It occurred twice as frequently in the male.

Mast states that if the condition is seen in the first year of life it is better to postpone surgery because of the high mortality at this time. Spontaneous closures of these fistulae may occur, especially if an obstruction is found and corrected. Pressure by pads and adhesive straps have occasionally been sufficient to effect a cure. It has been recommended that the urachal tract be opened and cauterized. In early childhood the upper extremity of the urachus may be ligated successfully. If simple procedures fail, more radical measures must be instituted. The entire tract may be dissected out, down to the bladder, ligated and excised, the stump inverted by a purse string suture and drainage instituted.

THE MORBIDITY AND MORTALITY IN SUPRAVAGINAL VERSUS COMPLETE HYSTERECTOMY*

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and
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Our reason for presenting this subject is the great difference of opinion as to how the cervix should be dealt with in performing a hysterectomy.

Some operators prefer a supravaginal hysterectomy in all cases; others perform a complete hysterectomy in all cases, and in the last few years a third group is advising supravaginal hysterectomy with cauterization or conization of the cervical stump. No doubt each operator of the three groups is convinced that he is doing the right thing, and perhaps he is, for none of us can tell until large series of tabulated cases treated by the various methods are interpreted. The aim in all the groups is one and the same: cancer prevention.

It has been said that from 0.5 to 2 per cent of all cervices left behind in performing supravaginal hysterectomy develop cancer; also, it has been said that complete hysterectomy is more hazardous and has a higher morbidity and mortality than supravaginal hysterectomy. Be that as it may, we have never seen a cancer develop on a cervix that was not pathological when the supravaginal hysterectomy was performed, nor

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do statistics show complete hysterectomy to be more desirous than supravaginal hysterectomy. Our opinion is that each case should be individualized and no one type of operation set for all groups of cases. All three types of operations have their indications. If a cervix is pathological, that is, if there is chronic cervicitis with or without erosion, a laceration with ectropion or any other lesion, a complete hysterectomy is indicated; but if some condition arises at the time of operation that jeopardizes the patient, then a supravaginal hysterectomy with cauterization or conization of the cervix is indicated. If the cervix is nulliparous and free of disease, a supravaginal hysterectomy is indicated. We grant you that a supravaginal hysterectomy is much easier to perform than a complete hysterectomy.

Table 1

MORTALITY IN SUPRAVAGINAL VERSUS COMPLETE HYSTERECTOMY

Authors	Supravaginal Hysterectomy		Complete Hysterectomy	
	Number	Mortality Per Cent	Number	Mortality Per Cent
Masson	217	1.8	229	1.3
Nelson	122	3.2	476	2.9
Fullerton and Faulkner	609	4.4	1078	4.1
Davis and Cusick	335	4.7	—	—
Burch and Burch	166	4.2	32	3.1
Mayo and Mayo	3085	1.2	1588	1.8
Bartlett and Simmons	2733	1.7	329	7.9
Greenhill	1857	4.5	551	4.7
Samuels and Edlovitch	276	2.5	—	—
Read and Bill	1739	2.1	605	3.1
Pearse	1900	1.8	—	—
Treston	100	2.0	100	1.0
Siddall and Mack	1141	2.6	235	6.4

In *Table 1,* various authors have tabulated their work. Five authors report a lower mortality and three report a higher mortality in complete than supravaginal hysterectomy. Two authors report practically the same mortality for both types of hysterectomy and three do not report their mortality at all. With the exception of Fullerton and Faulkner, all authors who mention morbidity and complications show them to be more frequent with complete hysterectomy.

In our series of 1,312 supravaginal hysterectomies and 631 complete hysterectomies performed at Barnes Hospital from January 1, 1921, to January 1, 1936, we had a morbidity of 25.4 per cent and a mortality of 3.4 per cent.

Table 2 shows the number of both operations with their morbidity and mortality rates for each year. You will note some fluctuations in the mortality rate from year to year. Why some years there was no mortality and other years a high mortality is unexplainable. Practically the same operators were working at all times. The morbidity is fairly uniform and, although it may seem rather high to many of you, we do not feel that a morbidity of 25.4 per cent is unusual. The morbidity was calculated from cases that ran a temperature of 101 degrees Fahrenheit for two consecutive days. Very few authors have studied and published their morbidity figures, which are most important. Also, you will note, with few exceptions, that the mortality per cent in complete hysterectomy is less than the mortality per cent in supravaginal hysterectomy. Most authors have reported similar figures and the explanation is offered that supravaginal hysterectomy is always performed

Table 2

SERIES SHOWING MORBIDITY AND MORTALITY AT BARNES HOSPITAL

Year	Type Hysterectomy	Number	Mortality Per Cent	Morbidity Per Cent
1921	Supravaginal	36	—	38.9
	Complete	17	—	35.3
1922	Supravaginal	29	3.4	24.1
	Complete	34	2.9	23.5
1923	Supravaginal	47	—	29.8
	Complete	22	—	27.3
1924	Supravaginal	57	1.8	24.6
	Complete	31	3.2	35.5
1925	Supravaginal	79	3.8	29.1
	Complete	43	2.3	38.4
1926	Supravaginal	88	6.8	22.7
	Complete	45	4.4	31.1
1927	Supravaginal	85	4.7	30.6
	Complete	44	2.3	36.3
1928	Supravaginal	105	2.9	11.4
	Complete	37	—	35.1
1929	Supravaginal	68	2.9	26.3
	Complete	40	5.0	57.5
1930	Supravaginal	107	2.8	18.7
	Complete	35	8.6	22.9
1931	Supravaginal	148	4.7	21.6
	Complete	50	.5	13.5
1932	Supravaginal	112	3.5	32.1
	Complete	39	2.6	38.4
1933	Supravaginal	94	5.3	14.9
	Complete	60	3.3	23.3
1934	Supravaginal	119	6.7	10.9
	Complete	78	1.3	24.3
1935	Supravaginal	138	2.9	12.3
	Complete	56	—	30.3
Total		1943	3.4	25.4

in cases that are considered poor risks, also that cutting through the cervix predisposes the patient to infection, as does cutting into the vagina. On the other hand, the morbidity in complete hysterectomy is far greater than in supravaginal hysterectomy. The explanation offered is that when an infected cervix is removed the infection is spread during the removal, but within a few days runs its course and then quiets down, whereas an infected cervix in supravaginal hysterectomy is left behind, keeping up the infection which causes disaster. The greatest causes of temperature in this series were wound infections, pyelitis and bronchopneumonia.

Table 3 shows comparative morbidity and mortality of different operators. We selected two groups of operators: Group 1, the two most experienced operators on the staff; and Group 2, consisting of twenty-five other operators on the staff, including the gynecological residents.

This was done in order to find out whether the more experienced operators had any less morbidity and mortality than the twenty-five other operators who consisted mostly of the gynecological residents. You will note that two operators performed 646 supravaginal hysterectomies with a morbidity of 21.7 per cent and a mortality of 2.5 per cent and 356 complete hysterectomies with a morbidity of 31.7 per cent and a mortality of 3.4 per cent. The twenty-five operators performed 666 supravaginal hysterectomies with a morbidity of 21.0 per cent and a mortality of 5.3 per cent and 275 complete hysterectomies with a morbidity of 36.7 per cent and a mortality of 1.5 per cent. The incidence of the lower mortality in supravaginal hysterectomy of the two operators is probably due to their greater experience and judgment. The morbidity is uniform. The mortality of the 25 operators for complete hysterectomy is less than those of the two operators, because no doubt the cases were selected very carefully and the poor risks were treated by the two operators. The morbidity of the twenty-five operators for complete hysterectomy is somewhat greater than for the two operators for the same reasons.

Table 4 shows the immediate causes of death. It is interesting to note that eighteen cases died from peritonitis and infection, fourteen died from embolus, five died from bronchopneumonia, six died from septicemia, six died from causes related directly or indirectly to anesthesia and one or more died from myocarditis, ileus, intestinal obstruction, anuria, hemorrhage, and brain tumor. Thirteen hundred and twelve supravaginal hysterectomies were performed with fifty-two deaths and 631 complete hysterectomies with fifteen deaths.

Table 3

COMPARATIVE MORBIDITY AND MORTALITY OF DIFFERENT OPERATORS AT BARNES HOSPITAL

Operators	Number Supravaginal Hysterectomies	Number Complete Hysterectomies	Supravaginal Hysterectomies Morbidity Per Cent	Complete Hysterectomies Morbidity Per Cent	Supravaginal Hysterectomies Mortality Per Cent	Complete Hysterectomy Mortality Per Cent	Total Morbidity Per Cent	Total Mortality Per Cent
2 operators	646	356	21.7	31.7	2.5	3.4	25.3	2.8
25 operators	666	275	21.0	36.7	5.3	1.5	25.6	4.1

Table 4

IMMEDIATE CAUSES OF DEATH, BARNES HOSPITAL

	Peritonitis and Infection	Shock	Broncho-pneumonia	Myocarditis	Embolus	Ileus	Septicemia	Anesthesia	Intestinal Obstruction	Anuria	Hemorrhage	Brain Tumor	Total
Deaths in 1312 supravaginal hysterectomies	13	3	3	2	12	4	5	5		2	2	1	52
Deaths in 631 complete hysterectomies	5		2	2	2	1		1	1	1			15

Table 5 shows morbidity and mortality with and without pelvic inflammation. Seven hundred and twenty supravaginal and 220 complete hysterectomies were performed for myomata with pelvic inflammation with 30 deaths and 7 deaths, respectively, with a morbidity of 21.9 and 39.1 per cent, respectively, and a mortality of 4.2 and 3.2 per cent, respectively. Three hundred forty supravaginal and 103 complete hysterectomies were performed for myomata without pelvic inflammation with 11 deaths and 2 deaths, respectively, with a morbidity of 17.9 and 29.1 per cent, respectively, and a mortality of 3.2 and 1.9 per cent, respectively. One hundred and seventy-three supravaginal and 154 complete hysterectomies were performed for retrodisplacement, chronic subinvolution, chronic metritis and adenomyosis with pelvic inflammation with 6 and 2 deaths, respectively, with a morbidity of 29.5 and 35.1 per cent, respectively, and a mortality of 3.5 and 1.3 per cent, respectively. Seventy-four supravaginal and 87 complete hysterectomies were performed for retrodisplacement, chronic subinvolution, chronic metritis and adenomyosis without pelvic inflammation with 3 and 1 deaths, respectively, with a mortality of 9 and 26.4 per cent, respectively, and a mortality of 4.1 and 1.1 per cent, respectively. It is to be noted that both supravaginal and complete hysterectomies for conditions complicated with pelvic inflammation have a higher morbidity and mortality than for conditions without pelvic inflammation.

Twenty-five complete hysterectomies were performed for early cancer of the cervix uteri with no deaths, but a morbidity of 48 per cent; and 42 complete and 5 supravaginal hysterectomies were performed for cancer of corpus uteri with a mortality of 11.9 per cent for the complete and 00 per cent for the supravaginal hysterectomies and the morbidity was 28.6 and 11.9 per cent, respectively. Ordinarily we do not perform hysterectomy for cancer of the cervix uteri. Our routine treatment is radium and x-ray. Over a period of fifteen years we performed hysterectomy for cervical cancer only 25 times. The 5 supravaginal hysterectomies performed for cancer of the corpus uteri were done because cancer was not suspected at the time of operation. Our routine treatment for cancer of the corpus uteri is radiation followed by complete hysterectomy. The 5 deaths in 42 complete hysterectomies for cancer of the corpus uteri giving a mortality of 11.9 per cent occurred largely because the patients were elderly women and very poor operative risks.

DISCUSSION

Our investigations show complete hysterectomy to have a lower mortality per cent and a higher morbidity per cent than supravaginal hysterectomy. This is partially explained by the fact that Barnes Hospital, from which this report is made, is a highly specialized hospital and that all the cases were operated upon by trained gynecologists. The facts outlined in these tables would be entirely different if the records of a general hospital were taken, where not only the gynecologist operates but the family physician and the general surgeon operates as

Table 5

MORBIDITY AND MORTALITY WITH AND WITHOUT PELVIC INFLAMMATION, BARNES HOSPITAL

Operations	Supravaginal					Complete					Total Morbidity Per Cent	Total Mortality Per Cent
	No. Operations	Temp. 101+	No. Deaths	Morbidity Per Cent	Mortality Per Cent	No. Operations	Temp. 101+	No. Deaths	Morbidity Per Cent	Mortality Per Cent		
Hysterectomy for myomata with pelvic inflammation	720	158	30	21.9	4.2	220	86	7	39.1	3.2	25.9	3.9
Hysterectomy for myomata without pelvic inflammation	340	61	11	17.9	3.2	103	30	2	29.1	1.9	20.5	2.9
Hysterectomy for retrodisplacement, chr. subinvolution, adenomyosis, chr. metritis with pelvic inflammation	173	51	6	29.5	3.5	154	54	2	35.1	1.3	32.1	2.4
Hysterectomy for retrodisplacement, chr. subinvolution, adenomyosis, chr. metritis without pelvic inflammation	74	7	3	9.0	4.1	87	23	1	26.4	1.1	18.6	2.5
Hysterectomy for cancer of cervix uteri	—	—	—	—	—	25	12	—	48.0	—	48.0	—
Hysterectomy for cancer of corpus uteri	5	—	—	—	—	42	12	5	28.6	11.9	25.5	11.9

well. From the practical standpoint, one cannot help but feel that a complete hysterectomy is a much more difficult and hazardous operation than a supravaginal hysterectomy. In performing a complete hysterectomy there are more serious structures to be encountered, the bladder is often traumatized, the ureters are sometimes ligated or severed, the vagina is opened and sometimes hemorrhage occurs due to varicosities or other causes.

It is true that a pathological cervix must not be left behind when performing a hysterectomy because of the possibility of cancer's occurring there, but at the same time the life of the individual must be considered, and when a complete hysterectomy is indicated, sometimes it is wise to perform a supravaginal hysterectomy and cauterize or do a conization of the cervix at the time of the operation or later. Often we overestimate the patient's capacity to stand a serious operation and the result sometimes is very unsatisfactory, so in order to prevent such a happening, as far as possible, the patient should be carefully classified. The case may best be disposed of after evaluating the history, physical examination and laboratory work up. Equally important is the selection of the type of anesthesia to be administered and the proper anesthetist to administer it. After all the details have been attended to, proceed with the operation as rapidly but safely as possible in order to shorten the duration of the anesthetic. After the operation a standard form of postoperative treatment should be followed in order to prevent the numerous postoperative complications which are likely to follow. If such a procedure is carried out, we are sure the morbidity and mortality in our hysterectomy work can be lowered, whether the operations be supravaginal or complete.

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THE RESPONSIBILITY OF THE GYNECOLOGIST TO THE SO-CALLED NEUROTIC*

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A convincing evidence of the advance of modern medicine is the fact that the well trained physician less often resorts to the term neurosis as a diagnosis. It is a joy and a rare privilege to have the occasional patient who neither exaggerates her symptoms nor understates them. The neurotic patient, whether she be born with the temperament or whether she be brought to that state by her environment, is one who unconsciously exaggerates her symptoms. She is one who would have excruciating pain from a pathological condition that would give the ordinary individual a mild discomfort. She is one who is inclined to be introspective and dwells on her discomforts, trying to evolve satisfactory explanations for them. Very frequently she has had a normal life until some critical circumstance or some combination of circumstances has made her start thinking of her body and its functions. All too often the start of her downfall is a mistake in the diagnosis of a simple ailment. Is it not probable that many diagnosticians, failing to find definite pathologic changes, are prone to discount the patient's statement and thereby overlook some rather obscure cause for the symptoms?

Thirty years ago nasal sinus disease was denominated "sun pain," because the pain was worse about sunrise, before the patient arose in the morning. It was only after Zukerkandle explained the significance of sinus disease, and clinical observers noted the improvement of symptoms after the patient assumed the erect posture, that the superstition of "sun pain" was understood. Not so very long ago "adenoid" children were whipped because of inattention. A patient with ear noises has been undiagnosed until a fortunate examination has revealed an aneurysm so situated as to produce the noise. Eye strain is frequently not recognized until after a patient has been humiliated with a diagnosis of neurosis. Formerly hay fever was considered a disease of the aristocratic leisure class. With the advent of x-rays the orthopedist ex-

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plained many pains that had been misunderstood. A patient who was considered the worst neurotic in his community was completely relieved after the removal of a cervical rib that had caused excruciating pain. Patients complaining of what is now recognized as Morton's toe were formerly considered neurotics.

Fractured spines were called railroad spines. Relaxed sacro-iliac joints were unexplained until recent years. Defective foot arches cause many leg aches. Hyperthyroidism, before it has produced its grave symptoms, is even now frequently unrecognized and patients are dubbed neurotics. With his discovery of hyperinsulinism, Dr. Seale Harris has explained away many symptoms that were formerly thought to be of "neurotic" origin. Dr. George W. Crile's diagnosis of neurocirculatory asthenia and its operative cure is to be observed with great hope. Pressure from an unerupted wisdom tooth can cause agonizing "neuralgia." The cure of chronic constipation can relieve a patient of a reflex that will change her mental outlook upon life. A woman who was credited with neurotic vaginismus of long duration was immediately relieved after the removal of a small urethral polyp. It is said that not infrequently incipient pulmonary tuberculosis is incorrectly diagnosed as gastric neurosis. Think of the many symptoms that have finally been explained by a four-plus Wassermann reaction. I understand that creditable work is being done here at Hopkins on the causes of unexplained fevers, which occur principally in young females.

It was recently found at autopsy that a friend and colleague of many of us here, whom we had thought of as a marked neurotic, had an intra-abdominal lesion which explained the symptoms that many had failed to diagnose.

Every specialty, with its intensified research and splendid instruments of precision, has invaded the ranks of the neurotics and thinned the lines. Is it too much to hope that, in the future, they may leave only a small remnant of the former vast army?

The very neurotic individuals usually prefer young physicians because from these not overbusy members of the profession they may expect a greater interest in their symptoms and more numerous and more painstaking examinations. I often recall an experience which I had in the very early days of my practice. A patient had kept the family and me in a furor for several hours with one of her periodic attacks of generalized muscular cramps. Late in the evening, after having received one dose of morphine and one of apamorphine, she was relaxing and I was on the point of leaving. The heart and lungs were examined, and the abdomen carefully palpated. To my great astonishment there was found considerable spasticity of the muscles in the right lower quadrant of the abdomen and some tenderness over McBurney's point. Her temperature proved to be 99.4°. I had seen this patient so many times with her muscle cramps and I was so convinced that she was a pure neurotic and I had been told by so many other physicians that she was a "so and so" neurotic, that I was not willing to take the sole responsibility of diagnosing appendicitis. My senior associate was called in consultation. He said: "She has appendicitis." I replied: "But Doctor, she is such a blank fool." I shall never forget the retort of my consultant. "Yes, my boy, but you must realize that a blank fool can have appendicitis." Operation at 2:00 a. m. revealed an acute appendicitis.

The neurotic is naturally more apt to fall a victim to real pathologic processes than is the individual who has a normal nervous system. As soon as a person is found to be somewhat neurotic, just so soon the responsibility of his physician becomes doubled. If the physician puts his patient in the list of his chronic neurotics he should watch the case more painstakingly and be ever on the alert to detect some real pathological process that may have become evident since the last examination. If a man be qualified to make the examination that is indicated one or two such examinations should satisfy him as to whether or not there is a real basis for the complaint. Perhaps a consultant in another field is needed. The neurotic patient receives a tremendous help from being assured that her body is fit. How many of us, having been feeling a little under the weather, take our temperature and, on finding that we have no fever, immediately feel considerably better?

Neurotics are encountered in every specialty, but surely there are more of them found in the practice of gynecology than in any other. The neurotic woman complains of backache, or of pain in the abdomen, probably worse in the lower abdomen, or of atypical menstrual periods, or of bladder symptoms, or of painful sexual intercourse, or of some other ailment, such as "in-laws." Frequently several of the above mentioned symptoms are complained of by the same individual.

Everyone here is familiar with the patient who gives a history of having been perfectly well and happy for years until some one of the symptoms

appeared. She goes to her family physician, who examines her, or maybe who does not examine her, and tells her there is nothing to be worried about, that she will soon be all right. The symptoms become worse and the physician can still find nothing to account for them, so he has a long talk with his patient, treats her in a most fatherly manner, and advises her to divert her mind. He may even convince her that she is neurotic and has no physiological basis for her complaint. After several weeks, or months, or sometimes years, a friend persuades her to consult some one else who is competent to make a diagnosis of some ailment which can be either cured or relieved. Such an individual is bound to be something of a neurotic before she is relieved of her trouble. For the rest of her life she may have a neurotic temperament.

Probably the most common cause for pain in the pelvis is the tenderness in the broad or utero-sacral ligaments caused by lymphangitis or lymphadenitis associated with cervicitis. A cervix capable of causing lymphangitis and lymphadenitis need not have an everted mucosa and visible Nabothan cysts, as is usually the case, but may have a fairly normal looking external os. There will be an excessive mucous discharge from the cervix. The high frequency electric knife is a great boon to the patient with such a cervix. The enlargement of the external os and the destruction or removal of the diseased tissue in the barrel-shaped canal will cure the cervix and relieve the tenderness in the broad and utero-sacral ligaments.

Tumors of the pelvic organs are readily diagnosed. Malpositions, especially those associated with adhesions or badly relaxed vaginal outlets, can likewise be easily demonstrated to be the cause of pelvic pain and backache. The results of injuries from childbirth are frequently overlooked in evaluating the causes of symptoms. The dyscrasias of the ductless glands should have due consideration. Not infrequently it is found that the follicular sex hormone, with thyroid extract in some instances, will give brilliant clinical results.

Dyspareunia or painful sexual intercourse is far more common than has formerly been thought. There is no symptom that will cause a patient more concern: nothing more likely to make her consider herself abnormal and cause her to become introspective. The causes of dyspareunia may be obvious, such as lack of gentleness, malformation of the vaginal canal, cicatricial contractures, the various inflammatory conditions of the vulva, vaginal canal or adjacent tissues, or they may be much more difficult to ascertain. A very common cause is ureteritis in the lower ureter. A vaginitis caused by yeast or *Trichomonas vaginalis*, if partially controlled by douches or other medication, often causes just enough inflammation to make coitus painful. The most common of the causes that are not obvious is the lymphangitis of the broad and uterosacral ligaments above mentioned.

A case of dysparenuia presented the following history:

A white woman, aged 35, wife of a vigorous mechanic, married sixteen years, para three, stated that since marriage sexual intercourse had been painful. She was told three months after marriage that she had no abnormalities and that she would be entirely relieved after the birth of her first child. She gave birth to three children in the next six years, but at no time had been relieved of the dyspareunia. She was told about ten years previously that she had an ulcer of the mouth of the womb and was treated a great many times, at the conclusion of which she was promised relief, but experienced none. She was extremely reticent in giving her history and said that she would never have sought relief again had her husband not insisted. She said that intercourse was extremely painful to her; that during the act she had pain deep in the pelvis and that she experienced pain in the rectal region. She could not sleep after intercourse and was hardly able to do her house work next day on account of pelvic discomfort. There was considerable vaginal discharge, for which she took daily douches. She was not constipated, but had "trouble with her bowels," and a dose of mild laxative would cause great discomfort from griping.

After the patient had been ushered into the examining room, it was learned from the husband that the wife complained a great deal, that coitus was allowed only once or twice a month, and that she had become convinced that she was abnormal, neurotic and that her case was hopeless. A vaginal examination revealed a normal vaginal canal, a marked cervicitis, tenderness in both broad ligament regions, but no masses in the adnexal regions. The fundus was normal in size, posture and mobility and great pain was experienced on the slightest pressure upon the recto-vaginal wall. Rectal examination was painful, but otherwise entirely negative except for spasticity of the rectum and the anal orifice. Abdominal examination revealed only generalized tenderness over the entire abdomen.

A diagnosis of cervicitis with bilateral broad ligament lymphangitis and spastic colon and rectum was made. The mechanism of these pain-producing conditions was carefully explained to the patient in the presence of the husband. They were told that a conization of the cervix with a cautery knife was advisable. A bland diet was advised and she was directed to take no laxatives. It was proposed that with these measures alone she would probably be relieved of the dyspareunia. The husband was enthusiastic that she try the procedure and she acquiesced. She entirely recovered from her chief

complaint and was in other respects in better health after treatment.

There is no greater difficulty encountered in diagnosis than that presented by the woman who comes complaining of pain in the back, or in the flanks, and who on examination shows no demonstrable lesion. On bimanual examination there may be tenderness in the pelvis, but no tubal mass, ovarian cyst, uterine tumor or malposition can be found. While the tenderness may be general, sometimes it will be exaggerated in one adnexal region, or on pushing the uterus toward the symphysis the patient may experience pain over the bladder. The impression is gained that here is a patient who surely has a definite pelvic disease and that some evidence of inflammation should be demonstrated. Frequently such a patient cannot relax sufficiently to have a satisfactory examination without a general anesthetic. If no definite pathologic condition is found, the patient should not yet be classified as a neurasthenic. Every care should next be turned to ascertain if there can be any fault of the bony pelvic or lumbar vertebrae.

Failure to diagnose an obstructed ureter frequently leads to a diagnosis of neurasthenia. This condition has no definite symptom-complex, but is one of the commonest causes of backache, lower abdominal discomfort and tenderness encountered in pelvic examination. The patient with obstruction of the ureters does not necessarily have kidney colic or pass blood in the urine; she may have no bladder symptoms. It is true that a majority of those suffering from ureteral obstruction will present some symptoms referable to the bladder or have in their histories some reference to such symptoms. In making bimanual examinations care should always be taken to palpate the bladder and the lower ureters, making sure that the uterus and adnexa do not come between the examining hands.

Fortunately a large number of ureteral strictures occur in the distal two inches of the ureter and in most cases of strictured ureters, as much tenderness will be found when the bladder and ureters are palpated separately as when the uterus is included.

When, on abdominal palpation, tenderness is found in either kidney region, or over the points where the ureters dip into the true pelvis, one should be on the alert for further evidence of ureteral obstruction. When any of these evidences are encountered it is imperative to advise, or even insist if necessary, upon a cystoscopic examination. The number of patients who have had one abdominal operation after another, trying fruitlessly to be rid of symptoms coming from this source is far too great. No more brilliant work was ever done than that by Guy L. Hunner in pointing out the significance and prevalence of ureteral stricture and devising a practical method for its treatment.

Mrs. O., a white woman, aged 38, gave a very unsatisfactory history. She stated that she had been sick for many years. The complaints chiefly were those of generalized abdominal discomfort and of occasional severe pain in her flanks and pelvis. She said, however, that she had pain in every part of her body. It was necessary to empty her bladder every few minutes. She had "terrible indigestion" and "bad constipation." There was a "vaginal discharge." It was feared she was already psychotic.

On examination it was found that she had a marked cervicitis. On bimanual examination she complained of extreme tenderness in the regions of the broad ligaments, the bladder and the lower ureters. The uterus was normal in size, position and mobility, and there were no masses in the adnexal regions. There was generalized abdominal tenderness, but more marked tenderness over the kidneys and the ureters. Pressure over Legg's points gave a sensation of full bladder. The urine was negative except for an occasional pus cell.

At the conclusion of the examination of such a neurotic individual one could be certain of only one thing. She had cervicitis and the cervix needed to be cauterized. It was explained to the patient and to her most sympathetic husband that it would take quite a long time to achieve any results. The cervix was cauterized and was about healed, when a cystoscopic examination was made. It was proven that she had bilateral ureteral strictures. Filling the kidney pelves reproduced the sharp pains of which she had complained. The dilatation of the strictures was carried out very slowly. She proved to be a most cooperative patient. Her improvement could be noted soon after the treatment was started. She has still a neurotic temperament, but from being a complaining invalid she has become an efficient wife. She has gained weight from 95 to 115 pounds.

Any women formerly dubbed neurotic has, most probably, a pathologic basis for her complaint. The term neurosis is the handy refuge of the destitute diagnostician. The responsibility of the gynecologist to the so-called neurotic is a great one. These persons with hypersensitive feelings and vivid imaginations deserve the most sincere sympathy, the most painstaking and thorough study, and the gentlest care.

1922 Tenth Avenue, South

HORMONE SENSITIZATION TEST FOR PREGNANCY*

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The purpose of this paper is to discuss the use of anterior pituitary-like hormone of pregnancy urine in the diagnosis of early gestation, to describe its technic and to give the results of my work with it.

The origin of the test is credited to two Viennese physicians, Drs. Porges and Pollatschek.[1] In 1929 they wrote a letter to the American Medical Association describing the test. Their reasoning was that in a pregnant woman an anterior pituitary-like substance was thrown into the system and the pregnant patient would probably not be sensitive to its injection, but a non-pregnant woman, having no anterior pituitary substance in her system, would be sensitive to this material. They accordingly injected the substance known as prolan into the skin of pregnant women and non-pregnant women, with the result that in the pregnant women a white wheal was all they saw, whereas in the non-pregnant women a reddened area of erythema followed the appearance of the wheel.

In 1930, Dr. Hyman Strauss,[2] of Brooklyn, New York, following the technic suggested by Porges and Pollatschek, and using a number of controls and pregnant and non-pregnant women, found that the results were not so good. Later, Porges and Pollatschek admitted that the method itself had an error of 18 per cent.

In July, 1933, Dr. Dowell[3] reported that he had used the test successfully in his practice, but gave no statistics. The test has been referred to by some as "Dowell's skin test for pregnancy." This, of course, is not correct.

In 1934, Strauss[4] again called attention to the fact that nothing had been discovered which would make the test any more accurate than it had heretofore been.

We next hear from the test in 1936. At that time Gilfillen and Gregg[5] gave a complete description of the technic and stated their findings.

Becoming interested in the subject, I communicated with Gilfillen and Gregg in order to get first hand information as to their findings and reaction to the use of "antuitrin S." The following is a resumé of their article, describing their technic and discussion:

"The test itself consists of an injection of 2 min. of 'antuitrin S' intradermally into the volar surface of the forearm. It is essential that the solution be fresh and that it has been in the ice box. Another important detail in connection with the test is that no alcohol is to be used in the preparation of the syringe, needles or the arm. These are all to be cleansed with sterile water. The reason alcohol is not used is that it lessens the potency of the hormone. It is important also that the solution be placed directly in the skin and not deep, as results are not satisfactory if the solution is placed below the superficial layer of the skin. An intradermal wheal similar to that of the tuberculin wheal is made. One then waits to see if a reaction will develop and at the end of a half hour the result is read. If there is no reaction, another half hour is allowed to elapse. At the end of that time if there is still no reaction, the patient is not observed longer. The reaction consists of an area of erythema about the wheal measuring in diameter from 7 to 35 to 40 mm. If the wheal becomes red but the skin itself does not, it is not a positive reaction. This is due to trauma and not to the presence of the hormone.

"A negative reaction is one in which there is no erythema surrounding the point of injection except that it overlies the bleb and measures 7 mm. or less. The reaction usually starts in the non-pregnant women within from one to three minutes. In patients who are 30 years or older the reaction is delayed an hour. In patients near the menopause the reaction is as late as three hours.

"It is obvious that a patient who is pregnant or who has aborted and retains some live decidual cells does not react to 'antuitrin S.' In every case of reaction we usually see a well defined erythema at the end of fifteen minutes. Patients who are pregnant or who have retained decidual cells often react to the skin test within twenty minutes, but the erythema will have disappeared within half an hour. In two or three instances a delayed reaction of 4 to 8 hours after injection has been noted. These were in pregnant women.

"It is interesting to note that in abortion where the Aschheim test is negative the 'antuitrin S' test is positive. In ectopics where the Friedmann test is negative for pregnancy, the 'antuitrin S' test is positive for pregnancy. The test should be of value in every form of disease that interferes with normal functions, such as an ovarian cyst. The presence of living decidual cells will give a pregnancy test. It should be of value in diagnosis of missed incomplete abortions.

"In malignancy the skin test shows the same as for pregnancy. The presence of anterior pituitary in a woman's system following delivery may be a factor in the prolonged lochia flow, especially in older women who do not have a sufficient amount."

In October, 1936, I selected a group of patients from the out-patient department of the obstetrical service at the Hillman Hospital and used "antuitrin S" in the manner described by

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Gilfillen and Gregg. The table below shows the results of this study, the types of cases selected by me being practically the same as those selected by Dr. Strauss in his work:

HILLMAN CLINIC

Condition	Number Cases	Results
Males	8	8+
Menopause	2	2+
Postpartum	12	12—
Menstruating	5	5+
Pregnant	20	20—
Non-pregnant	10	10+
Incomplete abortion	2	2—

+Erythema
—No reaction

I feel that the number of cases presented is too few to warrant the statement that the test is infallible and it should not be used routinely for a positive diagnosis of pregnancy. I believe that future experimental work in larger numbers of patients and over a long period of time will definitely determine whether or not the test has any value.

CONCLUSION

I do not intend in this discussion to give the impression that this test is new, as it has been in use since 1929. The test has been used with success by Dowell and Gilfillen and Gregg. In the small number of cases which I have presented here, I noted no failure.

It cannot at present be relied upon to take the place of an adequate history or physical examination or substituted for the use of the laboratory animal in the diagnosis of early pregnancy. However, along with these methods of diagnosis, it should be interesting to use the test to see whether it tallies with the clinical diagnosis.

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BENIGN LYMPHOCYTIC CHORIOMENINGITIS*

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The purpose of this paper is again to call attention to a new disease entity and give its clinical signs, symptoms, etiology, pathology and treatment.

The historical background of this disease is interesting. In 1926, Wallgren, of Germany, reported a clinical condition which he diagnosed acute aseptic meningitis; and in 1929, Viets and Watts, of Boston, reported several cases under the same diagnostic title. In 1930, Gager reported the disease from Virginia. In 1932, I was fortunate enough to encounter and report two cases which seemed to fulfill all the requirements of the disease described by Viets and Watts, and at that time I raised the question that this might be a new disease due to a filtrable or non-filtrable virus.

In 1934, Armstrong, of the National Institute of Health, isolated a virus which produced in monkeys, white mice, wild mice, and guinea-pigs a clinical disease entity. Armstrong stated that the human disease most nearly resembling this disease was, perhaps, the so-called "lymphocytic or aseptic meningitis" described by Wallgren, Viets and Watts, Dickens, Bloedorn, and others; and he demonstrated in the serum of a patient antibodies which protected mice against the virus. In 1935, Traub recovered a virus from white mice which appeared to resemble closely the virus isolated by Armstrong. In 1935, Rivers and Scott also reported the isolation of a similar virus from two cases of meningitis, and stated that the serum from these cases protected animals from the virus. From a point of priority, the credit of isolating this virus goes to Armstrong.

In the same year (1934) Armstrong and Lillie reported on the pathology of the disease as it occurred in mice. Lilly, in his study of the pathology, stated that the animals showed more or less pronounced swelling, edema, and lymphocytic infiltration of the choroid plexus. The cellular exudate was composed chiefly of lympho-

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cytes. The tissue reaction, when well marked, could be distinguished from that characterizing encephalitis of the St. Louis type.

In June, 1935, Armstrong and Dickens reported the disease under the new title of acute benign lymphocytic choriomeningitis and seemingly established that the etiology was definitely a virus immunologically identical with the one previously isolated by Armstrong. At this time it was shown that the blood serum of patients recovered from the disease protected mice from the Armstrong virus which had previously uniformly produced the disease and resulted in the death of the mice.

That there is urgent necessity for early diagnosis in patients showing signs and symptoms of cerebrospinal involvement is definitely recognized by the clinical pathologist. The difficulty in establishing an etiological diagnosis when the cellular response in the spinal fluid is preponderantly lymphocytic in character has also been recognized. For, while the lymphocytic cellular content of the cerebrospinal fluid limits to a few the diagnostic probabilities to be considered, there will always be cases in which the etiologic agent cannot be established.

The clinical picture of the disease is that of an infection of the upper respiratory tract, followed by meningeal symptoms which are ushered in by sudden onset with headache, nausea and vomiting, rise in temperature to 100 to 103° F., stiff neck, and usually a positive Kernig's sign. There is no evidence of nerve involvement; and the neurological examination is negative. The disease runs a benign course for about ten days or three weeks. The temperature declines by lysis and recovery is complete without residuals of any kind. The disease has been found in the young, but the second decade, 20 to 30, accounts for about 75 per cent of the cases, the youngest in my series being 19, the oldest 33 years of age.

The cerebrospinal fluid is under slight increase in pressure and is clear, or, at the most, slightly hazy. The cellular response is almost entirely lymphocytic; rarely in the disease we may find as many as 10 per cent polymorphonuclear leukocytes in the fluid. The number of cells may range from 50 to 2,000, according to the severity of the attack. The chemistry of the spinal fluid is important in that the sugar, chlorides and urea content will be found within normal range. The Kahn or Wassermann is negative; the colloidal gold curve will be in the meningitic zone and of low color change. No organism or clot can be demonstrated. Drainage of a few cubic centimeters of cerebrospinal fluid will usually relieve the headache and nausea and quiet the patient. The white blood cell count may show a slight increase up to 9,000 or 11,000, with a fairly normal differential percentage.

Early in the disease, and in our series up to the second week, the blood serum failed to protect mice against the virus of Armstrong. Beginning in the third week, the blood serum in high dilution protects mice against the virus. This protection may last for years; three or four cases have demonstrated antibodies four years after recovery from the disease. The disease is benign in nature and no deaths have been reported. Monkeys, mice and guinea-pigs have been found to be susceptible to the disease, and it is conceivable that a reservoir for the virus may exist in animals. The treatment is purely symptomatic.

The fact that the cerebrospinal fluid shows no tendency to clot and that the sugar, and especially the chlorides, remain within normal limits, are most important diagnostically and point definitely against tuberculous meningitis, with which the disease is at first often confused. The fact that no muscle weakness or definite neurological signs are found helps to rule out encephalitis (of all types) and acute anterior poliomyelitis.

The disease is differentiated from encephalitis (of all forms) by the absence of all neurological symptoms in benign lymphocytic choriomeningitis. In tuberculous meningitis, the chloride content of the cerebrospinal fluid, expressed as sodium chloride, is markedly diminished. In benign lymphocytic choriomeningitis there is no diminution of the sodium chloride or sugar content of the cerebrospinal fluid. It is recommended that all cases in the upper age group diagnosed infantile paralysis, but which show no paralysis, should have the mouse protection test to determine whether or not the virus of Armstrong is the causative agent.

The disease has been reported from a wide geographical area. I have a registry of cases from Maine, Maryland, Virginia, Pennsylvania, North Carolina, and California.

The choice of the designation of benign lymphocytic choriomeningitis was made for the following reasons:

(1) The disease is benign in character; no deaths having been observed or reported.

(2) The cellular response of the spinal fluid is lymphocytic. No other abnormality, either in cytological or biochemical findings, has been demonstrated.

(3) The virus produces pathologic changes in the choroid plexus in mice. Dr. Lillie, Pathologist at the National Institute of Health, found that the microscopic lesions consisted of a cellular infiltration of the meninges in which lymphocytes predominated. There is often a lymphocytic infiltration of the choroid plexus, which is a differential diagnosis point from the St. Louis encephalitis virus infection in mice. In addition to involving the choroid plexus, it involves the meninges.

Therefore, the term benign lymphocytic choriomeningitis gives the clinical, laboratory and cellular pathology and describes the disease fairly briefly.

SUMMARY

(1) A symptom-complex of headache, fever, meningeal irritation, cerebrospinal fluid under increased pressure, with an increase in cells (with a lymphocytic response dominant) above 50, coupled with a normal chloride, sugar and urea content in the cerebrospinal fluid and a negative spinal fluid Wassermann, is a clinical entity which has previously been designated as acute aseptic meningitis.

(2) The blood serum of patients recovered from the disease protects animals from the virus of Armstrong (National Institute of Health strain).

CONCLUSIONS

(1) The etiological agent is a filtrable virus first described by Armstrong and Lillie; therefore, the term "aseptic" is a misnomer.

(2) The blood serum of patients recovered from benign lymphocytic meningitis protects animals from the virus. This may be used to confirm the diagnosis, the disease being due to a virus.

(3) Monkeys, mice and guinea-pigs are susceptible to the virus, and it is conceivable that a reservoir of the disease may exist in animals.

DISCUSSION (*Abstract*)

Dr. James W. Watts, Washington, D. C.—In discussing acute lymphocytic meningitis, or benign lymphocytic choriomeningitis, Dr. Dickens minimized the part which he played in establishing it as a disease entity. Dr. Dickens not only described some of the earliest cases in the country but, with Armstrong, of the National Institute of Health, provided proof that this condition is caused by a specific filtrable virus.

In 1928 two patients entered the Massachusetts General Hospital within a week of each other and after the first examination of the spinal fluid their relatives were told that they had tuberculous meningitis and that they would probably die within a month. Within that time both patients recovered. A study of the spinal fluid findings showed that although the pressure, the cell count and the protein were increased, the sugar and chlorides were normal. These cases were described in a preliminary report under the name of "aseptic lymphocytic meningitis" by Viets and Watts. In the spring of 1929 three more cases were observed at the Massachusetts General Hospital and this time, although the clinical picture resembled tuberculous meningitis, our finding that the sugar and chloride content of the cerebrospinal fluid were normal caused us to give the family a good prognosis.

In the meantime we learned that similar cases had been described by Wallgren, of Gothenburg, Sweden, in 1925. In 1933 Viets and Watts re-examined the original five cases and found that none had residual symptoms. They also reported nine additional cases.

Dr. Viets was kind enough to send me the manuscript of a paper to be published in the *Journal of the American Medical Association* by Viets and Warren. One case was very severe and during the course of the illness developed a right facial weakness and sluggish tendon reflexes. The respirations went down to 4 per minute. Upon several lumbar punctures the cell count varied between 3,800 and 3,900 lymphocytes and one sugar estimation was recorded as low as 40 milligrams per 100 c. c. This patient recovered completely and examination of the blood by Armstrong, of the National Institute of Health, showed strongly positive antibodies against the virus of choriomeningitis. Another case described by Viets and Warren deserves special mention because it raises the question whether the word "benign" should be applied to the disease. The patient, a man 20 years old, had headache and vomiting for seven days before admission to the hospital. Upon examination he had a temperature of 102.4°, stiffness of the neck, and retention of urine. He was clear mentally. On the fourteenth day of his illness he became restless, had one convulsion, followed half an hour later by a second, in which he died. The cerebrospinal fluid pressure was increased, the cell count ranged from 280 to 330 lymphocytes per cubic millimeter, and the protein was slightly elevated. The chlorides were normal and the sugar estimations were 40 and 50 milligrams per 100 c. c., respectively. The general autopsy findings revealed congestion of the lungs, liver, kidneys and spleen. The brain and spinal cord were congested and cut sections were injected. Upon microscopic examination the meninges were edematous and congested and showed lymphocytic infiltration. Cellular infiltration extended along the vessels into the brain tissue. Perivascular infiltration was present in both the white and the gray matter. Lymphocytes of a small type predominated, but there were some large lymphocytes and a few endothelial cells. Foci of gliosis were frequent. Mild changes in the ganglion cells were present. These pathologic changes were present in the cerebrum, the midbrain, medulla and upper part of the spinal cord.

Dr. Dickens (closing).—I wish to thank the Section on Pathology for the privilege of reporting for the first time before the Southern Medical Association the new disease, benign lymphocytic choriomeningitis.

There is little, if anything, that I can add in closing except to state that Dr. Armstrong's finding of the virus in all fluids of the body except bile is a most interesting one. This is contrary to the findings in

acute anterior poliomyelitis in that the virus of poliomyelitis has never surely been demonstrated in the blood or cerebrospinal fluid of man.

Dr. Armstrong's figures on the prevalence of the disease lead one to believe that the diagnosis is all too frequently missed. What the pathology may be in man awaits the histopathological study of autopsy material from a case in which the virus was recovered. This has not yet occurred. I am cognizant of the fact that Dr. Viets, of Boston, has reported a death with autopsy findings which are most suggestive of this disease, but in view of the fact that the virus was not recovered or a virus mouse protection test obtained the diagnosis remains in doubt.

It is believed that the number of polymorphonuclear leukocytes found in the cerebrospinal fluid of his case would negative the diagnosis of choriomeningitis. In no case where we had an increase in polymorphonuclear leukocytes in the cerebrospinal fluid of any marked degree, even though the lymphocytes were the dominant cell, has the virus mouse protection test been found positive.

No case has been reported as occurring in children in this country. However, authors in England have reported a few cases occurring in the younger age group. When a new disease first invades a commmunity the attack rate is highest in the upper age group. Succeeding waves of the disease attack the younger age group. We should be on the lookout for this disease attacking children in future epidemics.

It is possible that we may have benign lymphocytic choriomeningitis without metastasis to the central nervous system. However, I have not yet seen or read a report of such a case.

COMMENTS ON VIRUS DISEASES AND THEIR CONTROL*

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It would be of no particular service at the present time to discuss the ultimate nature of viruses, whether they are alive, as we are accustomed to think of living entities, or are inscrutable autocatalyctic products of cells threatening race suicide by generating them. The latter idea, be it said, would seem to negative Weisman's old thesis that many cells are potentially immortal, and would imply that living things have their devolutionary as well as their evolutionary forces. These are fundamental problems, to be sure, but their import at present is academic and not germane to an immediate practical outlook.

It is worth while, it seems to me, to direct very especial attention to what viruses do in ways that may be readily apprehended; and in so far as our methods may penetrate, to discover how these effects are brought about.

In order to think constructively about viruses one must reasonably interpret their behavior in the light of individual and comparative studies. If this is done it appears that they require a living cellular medium for the continuation of their existence as infective, disease-inducing agents. The evidence at hand forces one to the conclusion that they are reproduced only in or by the internal medium or protoplasm of living cells. The evidence also abundantly confirms us in the opinion that each virus under natural conditions of disease finds certain cells or groups of cells of the host especially susceptible or available for its invasive and reproductive necessities.

These conclusions are of immediate importance, for they involve mechanisms governing the entrance of viruses into susceptible hosts, their active or passive multiplication and elimination. These are matters of utmost concern to those who are endeavoring to control and combat infective diseases. An understanding of the pathogenesis of contagious disease not only would lay a scientific foundation for prevention and control, but would also indicate possibilities for a rational effort to cure.

From a knowledge of the mechanism of pathogenesis, the public health worker may learn to a certain extent how elimination of virus from an infected host and its reëntry into susceptibles can be prevented; but practical experience indicates that given a full knowledge of the facts of pathogenesis there would still be need of more practicable and efficacious methods of prevention than those of isolation of the infected, and proper disposal of infectious material. For additional means of prophylaxis the health worker must look especially to the possibilities of immunity, using this term in a broad sense to include temporary methods of conferring resistance or creating barriers to invasion by viruses, temporary methods of enhancing the combative forces of the host after invasion has occurred, and most important of all, means of conferring upon susceptible hosts a state of permanent insusceptibility.

SMALLPOX AND VARICELLA

Each virus, like parasites in general, has its own peculiar way of invading the host. It is not possible therefore to consider viruses as a group in this respect any more than it would be to consider pathogenic bacteria as a whole. Cer-

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tain viruses, however, behave somewhat similarly in their attack upon the host and for the sake of illustration may be discussed together. There are, for example, smallpox and varicella, whose clinical pictures are characterized by the appearance of cutaneous eruptions. These eruptions are so disposed in their typical forms as to indicate quite definitely that the viruses which cause them are transported by the blood stream, for the specific cutaneous lesions are associated with the local presence and multiplication of the infecting agent. In the case of smallpox the virus has been demonstrated to be present in the blood stream during the disease. Owing largely to the lack of an experimental animal susceptible to varicella the presence of virus in the blood stream during the disease has not been demonstrated so far as I am aware, although virus is demonstrably present in the lesion, as was shown by Kling by inoculating children with vesicular contents.

Because the eruptions of these two diseases evidently proceed from virus harbored in the blood stream, one must assume that there is a primary focus of infection from which virus disseminates. In other words, there must be a primary source of virus production. It is very probable in both these diseases that the primary focus is in the upper respiratory tract. It may be assumed from what we know of viruses in general that the viruses of smallpox and varicella enter the host through the mouth or nose and infect the epithelium and subepithelial cells there perhaps in a restricted focus. For a complete understanding of the pathogenesis of these two diseases such primary foci representing the portal of entry of the host should be identified. Both these viruses are capable of affecting epithelium and cells of the connective tissue, so that the assumption of an original lesion in the mucosa of the upper respiratory tract is reasonable.

If this is the case the virus of each of these diseases has two principle routes of exit from the body: at first and early in the disease through the secretions from the mouth and probably from the nose; later in the disease through the eruptive lesions of the skin. It is probable that the former route is the more important in spreading these diseases, and without a primary lesion there vaccinia virus has been shown to be present in the pharynx soon after a cutaneous "take."

It is not to be concluded in either case that the presence of virus in the blood stream indicates a septicemia in the sense that virus is growing in the fluids of the body. There is no evidence of this. It is probably passively transported by the blood stream either free or within leukocytes to come in contact with susceptible cells of the skin and elsewhere which in some unknown way become exposed to its attack.

If one may draw an analogy between the eruptive lesions of smallpox and those of vaccinia, it may be assumed that endothelial cells of the skin are first involved by the lodgement and entrance into them of circulating virus, for it has been shown experimentally that both endothelium and fibroblasts are susceptible to this virus. Likewise it is known that local irritations of the skin predispose to the localization of the eruption of varicella.

The infection seems therefore to proceed from one susceptible cell to another, and in order that there may be an invasion through the upper respiratory tract there must be exposed susceptible cells, and, for a cutaneous eruption to ensue, the virus must be transported by the blood stream and again localize in exposed susceptible epithelial cells of the skin.

YELLOW FEVER

Standing alone at present amongst human virus diseases in the mode of its transmission is yellow fever. In this disease the usual portal of entry is not the upper respiratory tract, but the skin, the outer coating of which is penetrated by the bite of the mosquito, and the virus injected from the salivary glands through its proboscis. It would be of great interest to study histologically the original lesion resulting from the infecting bite of a mosquito, for it is reasonable to assume that there is a local multiplication of virus at that point, with a secondary dissemination of virus into the blood directly or indirectly; because in the early days of yellow fever the virus circulates in this medium. It is quite probable that vascular endothelium is the susceptible cell initially attacked, secondarily the hepatic epithelium and perhaps other tissues. While the natural mode of infection is by the bite of a mosquito, yellow fever is very contagious in the laboratory and the virus may infect directly through the apparently intact skin or mucous membranes.

Virus of this disease emerges from the infected host by a mechanism similar to that of its entrance, that is, by the aspiration of infected blood by the bite of a mosquito. The virus harbored in the blood is capable of survival but apparently not of multiplication in the body of this insect

vector, and so may be returned to another susceptible human being.

In those diseases in which virus is abundantly present in the circulating blood it is to be suspected that endothelium of the host is especially susceptible. In the case of distemper of dogs a susceptibility of this tissue can be readily demonstrated, as has been recorded recently by DeMonbreun.

RABIES AND POLIOMYELITIS

Most interesting from the standpoint of pathogenesis are those virus diseases which affect principally if not altogether the cells of the nervous system. As examples we may cite rabies and poliomyelitis.

So far as is known, these viruses require a nerve-cell medium for invasion of the host and for inducing their morbid changes. Consequently one must suspect that by the bite of a dog rabic virus is inoculated directly into or onto exposed nerve filaments; and the more recent experimental work with poliomyelitis indicates that the usual channel of invasion for this virus is through the exposed nervous filaments in the nasal mucosa. Experimental work further indicates that any exposed nervous filaments might be receptive for each of these viruses, and it is not surprising that infection with rabic virus has been reported as occurring after an application of virus in saliva to the cutaneous surface, for without visible abrasions it is quite possible for nerve filaments to become exposed to the virus under such circumstances; and it would not be surprising if occasional or frequent infections by the poliomyelitis virus take place from an invasion through similar exposure of nerve filaments in the oral or pharyngeal, or even the intestinal or respiratory, mucosas of the human, as may happen in experimental infections with herpetic virus in rabbits. The important thing is contact of virus with susceptible nerve cells or their processes. In the case of rabies this occurs usually traumatically, in poliomyelitis probably from virus transported by droplets through the air onto the exposed nerves of the upper respiratory mucosa.

After the initial application of virus to exposed nerves there is substantial experimental evidence that the infecting agent progresses centripetally along nervous channels, and more specifically within the axis-cylinders of neuronal processes. It is assumed that the neurotropic viruses may extend by multiplication within this favorable medium, and reaching the central nervous system become distributed by way of similar channels through the susceptible tissue along courses determined by the anatomical relationship of contiguous nervous pathways, modified by especial susceptibilities of these various channels. Once on the interior the poliomyelitic virus is most damaging to motor neurones, and in general the rabic virus is more injurious to sensory cells.

Egress of virus from the host in these two diseases is by way of the same kind of channels, namely, nervous processes, because the virus may progress centrifugally as well as centripetally along nerve filaments. Rabic virus possesses great facility in this respect in the infected dog, for it emerges in abundance through the salivary glands, fed especially by infected ganglion cells, and possibly by actual infection of the parotid glandular epithelium; for we have found in these glands foci of acute necrosis in which structures resembling Negri bodies were present in these cells. It is, however, doubtful that the virus of rabies is eliminated through human saliva; consequently man would not constitute presumably a satisfactory natural host.

Poliomyelitic virus is eliminated through the nose in man, and probably through the same nervous channels which admit it. But it is theoretically possible for it to emerge through other mucosas. So it is in the form of a suspension in naso-glossal secretions that the viruses of rabies and poliomyelitis reënter the outside world to repeat in susceptible hosts their cycle of reproduction.

COMMON COLD, INFLUENZA, MEASLES

In the diseases under consideration, namely, smallpox, varicella, yellow fever, rabies and poliomyelitis, emphasis has been placed on the intimate and seemingly necessary relationship of the respective viruses to cells of the host in explaining the phenomena of pathogenesis, especially the ingress and egress of virus to and from the infected host.

The pathogenesis of such diseases is explainable rationally on the hypothesis of cytotropism, that is, a necessary reproductive relationship of the viruses with certain cells of the host. Ideas of pathogenesis are, I believe, greatly obscured, and unnecessarily so, by the use of such undefined terms as viscerotropism, organotropism, pantropism with reference to these viruses. If tropism of viruses means anything, it means an intimate relationship of virus with specific living susceptible cells, and in order to clarify pathogenesis, the types of cell affected must be

exactly defined. It is only in this way that the facts of pathogenesis may be accurately analyzed and used scientifically for theoretical and practical purposes.

In another group of virus diseases, so called, a similar cell-virus relationship has not been demonstrated. These diseases may be illustrated by the common cold, influenza and measles. Recent research indicates that the viruses of these specific infections are indeed filterable, but cytological evidence of a reproductive relationship to special cells of the host has as yet not been forthcoming.

One may properly speak of those viruses in which a specific cell-virus relationship is demonstrable as cytotropic viruses. This, then, does not as yet apply to the viruses of the common cold, influenza and measles, because in the lesions of these diseases there had not been discovered the specific cellular changes which characterize the lesions of cytotropic viruses.

We do not have, therefore, a satisfactory morphologic basis on which to interpret the pathogenic phenomena of these diseases. That their viruses gain admission and exit through the upper respiratory tract seems evident, and in the case of influenza and measles the virus circulates in the blood stream.

It is to be hoped that further cytological work will bring to light more detailed information with respect to the behavior of these viruses in the susceptible host.

The cell-virus relationship in virus infections has been especially emphasized in this discussion because a proper understanding of the pathogenesis of virus diseases cannot be attained without knowledge of the cellular phenomena attending them.

IMMUNITY TO VIRUS DISEASES

Assuming on good and reasonable grounds that viruses require a living cellular medium for their multiplication and pathogenicity, and that the cell-virus relationship is a very specific and delicate mechanism, it is only necessary to know the requirements of each virus in the way of exposed susceptible cells at its common portal of entry, to enable one to attempt at least the imposition of artificial barriers in the host against infection. Protection of the host by removal from sources of infection by such means as restriction of intercourse has been long in practice. Attempts to treat the susceptible tissue of the host at the portal of entry are just beginning, and this method may disclose important aids to preventive measures of the future. The theoretical basis for these attempts is the thought that the exposed susceptible tissue may be so altered by various means that although virus contacts the host, it will be barred from entrance into its necessary cellular medium and will therefore remain innocuous.

The recent experiments of Armstrong and others with the picric acid spray in monkeys have given reasonable hope that this method might prove of benefit in preventing infection by poliomyelitic virus in man. It will be difficult, however, to prove this, but not impossible with time and opportunity. At least we should learn from current experience whether the treatment itself is without harm.

It is assumed that the experimental prevention of infection of monkeys following intranasal instillation of virus by a previous picric acid spray is determined by a barrier of coagulated or altered secretion enveloping the exposed nerve terminals in the nasal mucosa. It is quite possible, it seems to me, that this treatment may change the qualities of the exposed nervous tissue itself so that it is no longer a suitable medium for virus penetration or reproduction.

This line of attack, the attempting of slight chemical or physical alteration of susceptible cells so that their functions are not severely altered but their property of accepting and promoting virus invasion is impeded, is, to my mind, hopeful and should be exploited. The absence or presence of certain vitamins and internal secretions might also affect primary invasion.

It has been shown with a reasonable degree of certainty that some virus infections may be prevented or aborted by the more specific procedure of passive immunization, that is, by the injection before invasion or soon thereafter, of serum from recovered hosts. This method is of advantage in measles and mumps as a prophylactic procedure, but it has not proven to be of value beyond doubt in protection against some other virus diseases such as poliomyelitis. It is probable that this method would be of use only in those instances where virus must come into contact with the humoral antibodies during its dissemination in the course of its invasion, and in consequence be held in check and prevented from entering susceptible cells by the antiviral effect of the immune serum. It would be of especial value probably in those diseases where virus must be transported passively in the blood stream extracellularly in order to come into contact with susceptible cells, or where

antibodies become excreted in sufficient concentration at the site of the portal of entry to prevent invasion of susceptible tissue. The latter may happen in mumps, for example.

But in such diseases as rabies and poliomyelitis this method theoretically would be of little avail or of no use at all, for it appears in these instances that virus must come into immediate contact with exposed nerve tissue in order for infection to take place. After the viruses of poliomyelitis and rabies enter nerve filaments they appear to have a clear track ahead to the central nervous tissue, protected presumably from circulating antibodies by incorporation within the cytoplasm of these cells. In any event, the methods of passive prophylaxis by the use of immune serum must be limited in its usefulness because of its temporary effect.

The method of choice in inducing resistance to infection by viruses would seem at present to be that of active, specific immunization, such as has long been practiced effectively in Jennerian vaccination. Practically, active immunization has not been so effective in general as might have been hoped, but the method is far from exhausted of possibilities for future usefulness.

The hopeful element in the situation is that practically all virus diseases confer upon the recovered host a lasting immunity to reinfection by the same agent.

In order to utilize the method of active immunization effectively we have had up to the present time only the procedure of introducing into the host what may well be in every instance of success the living virus. This involves a delicate situation, for it presumably necessitates the induction of infection, apparent or inapparent; and unless the dangers attendant upon the natural disease are eliminated by the procedure it is not applicable for human use. We have recently witnessed the attempted vaccination against poliomyelitis in which it appeared that the vaccine was at times, even though infrequently, responsible for maiming or fatal infections, and it was only proper that the method be abandoned in practice.

In the case of antirabic vaccination, vaccines have been developed which are safe in so far as the probability of inducing the disease is concerned; and statistical evidence indicates that human rabies has diminished since the Pasteur treatment was inaugurated. The exact effectiveness of antirabic vaccines now in use is, however, problematic, and it is a very difficult matter to determine their effectiveness under circumstances of infection which are so uncertain, and in which the possibility of adequate control is wanting. It is therefore encouraging that a new attack and new methods are now being applied to a solution of this problem.

On the other hand, it must be realized that, so far as one may judge, active immunity to virus infections is brought about by antigens which in all probability are not in themselves infectious, very labile substances no doubt, difficult of detection and manipulation. But if there are such specific antigens, not infectious but capable of inducing the immune response, they should in time be recognized and adapted to the use of active immunization. At least there is reason for such a hope, and the probabilities of success will be increased by the number and zeal of workers who look for them.

The experimental work of recent years has taught us much concerning virus diseases, and the effects of viruses upon specific cells of the host. New diseases have been identified etiologically, new mechanisms of pathogenesis have been brought to light. It is not too much to expect very soon the introduction into practical prevention new and more effective methods of control of this great group of infective disorders.

AUTOHEMOTHERAPY IN DERMATOLOGY*

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As practical physicians we are constantly taking up new methods of treatment, trying them out for varying periods of time, and if not immediately impressed with the results obtained, discarding them for methods more promising. When one briefly reviews dermatological therapy he is surprised at the hectic history of any measure. To be convinced of this, one has only to review his personal experience of the past ten or fifteen years. In some instances he would be chagrined and often amused at the outlines of treatment followed in the past.

We are all experimenters at heart and for some reason, or apparently for no reason at all, chance upon a line of therapy. If it gives or promises results it is published or passed by

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word of mouth to colleagues, who immediately seize upon it and not being content with the original method, immediately try it out on similar conditions or upon those conditions for which there is no satisfactory treatment. If this particular treatment is of sufficient value in any one disease to withstand its various criticisms, it will remain as a standard therapeutic procedure; otherwise, due to the many conflicting reports from all types of experimentation, it is slowly but surely discarded, and often becomes the stock in trade of the quack or charlatan, who exploits to the full any value there may be in the procedure. If there is any virtue in it, many years later the same procedure is brought forth again in the same or in a little different guise and, going through the same process, is more carefully analyzed and confined more particularly to its peculiar value without expecting or finding it to be a panacea, it then receives its true place in our therapeutic armamentarium.

In December, 1910, Mayer and Linser[1 2 4 8] published a communication on the results of treatment of a case of herpes gestations by injections of a serum obtained from the blood of a pregnant woman. Following this report, the treatment of other toxic dermatoses was reported by the same writers, then by Freund,[3] by Fetzer,[5] Veiel,[6] Rubsamen,[7] Heuck,[9] and Practorius.[10] The conditions treated by this method included urticaria, pemphigus, dermatitis herpetiformis, strophulus and various hemorrhagic diseases of the skin. Other writers, including Ullman, were less favorable in their comments. Spiethoff[13] apparently was the first to use the serum obtained from the patient himself. He claimed good results in a number of dermatological conditions. Gottheil and Satenstein[11] were the first in this country to report on the treatment of dermatologic conditions with autohemotherapy. Their report included patients with psoriases, radiodermatitis, furunculosis, dermic abscesses, chronic urticaria and lichen planus. This was quickly followed by a report from Howard Fox,[12] whose work was limited almost entirely to the treatment of psoriasis. These reports were followed by others in various dermatoses with moderately favorable results. There were numerous communications for a time which might be termed enthusiastic, but a little later as the treatment was used for more and more conditions the tone of the reports began to change to a more pessimistic note. All of these reports described the complicated method of removal of blood and a later intramuscular injection of the centrifuged serum. The simpler method most commonly used at the present time is intramuscular injection of the freshly withdrawn blood before it has had time to clot, a method first introduced by Ravaut[14] in 1913. Various observers have pointed out that different clinical results may be obtained by the different methods used in the injection of blood, but Wright,[15] in 1930, was still enthusiastic concerning the simpler method of autohemotherapy as an adjunct in the treatment of psoriasis.

There has never been a completely satisfactory explanation of the mechanism of the action of autohemotherapy. Burgess,[16] in 1931, after a study of the various explanations offered, drew the following conclusions:

(1) The action of whole blood injections does not depend upon the production of a leukocytosis.

(2) The hemoclysis crisis is not a satisfactory test for allergy and bears no relation to the whole blood injections.

(3) Whole blood injections had no effect on the sedimentation rate of the red corpuscles as estimated by the methods of Zechner and Godell.

(4) Proteose was obtained from the urine of normal persons and from those suffering from various dermatoses. No constant effect on the production of proteose by a single whole blood injection could be demonstrated.

We first began the use of autohemotherapy as an adjunct in the treatment of psoriasis some six or eight years ago and use the following routine: eight to ten cubic centimeters of fresh blood are withdrawn from the cubital vein and immediately injected into the gluteal muscle at weekly intervals, using along with it mild local applications. This method of treatment has served us extremely well as an aid in the intractable cases of psoriasis. We have been somewhat unfair to autohemotherapy in that we have reserved its use for the most difficult cases. The average number of injections required for relief is approximately ten. This method of treatment in psoriasis has unquestionably given us good results in the attack, but it cannot be

said that it is curative, although the intervals between attacks has seemed to be lengthened.

The following case is typical:

Mrs. Mc., aged 33, a physician's daughter, had not been clear of psoriasis since she was a small girl in spite of treatment under the direction of competent physicians with the usual drugs such as chrysarobin and ammoniated mercury. The eruption was present particularly in the scalp and to a lesser degree on the trunk and extremities. She was given autohemotherapy at weekly intervals for ten weeks, when her skin became normal in appearance. The disease recurred in a few months' time and she again responded to the blood injections. Since she has not been regular with the treatment we have not been able to follow her case over a sufficient period of time to determine whether or not it can be controlled by the continuous injection method.

We feel that we can recommend autohemotherapy as a most useful adjunct in the treatment of psoriasis.

There have been numerous reports of the efficacy of autohemotherapy in vesicular and bullous diseases. Our first attempt in this direction was a patient, Mrs. M., with recurring herpes simplex, who had been treated by several competent dermatologists with local applications, x-ray, calcium and the usual non-specific therapy with apparently no results, was started on autohemotherapy. Her improvement was so spectacular that we have since used it in many such cases, and although apparently no case has ever failed to respond, there have been a number in which recurrences took place.

The one disease in which we should particularly like to commend the use of autohemotherapy is herpes zoster. In fact, we have been so favorably impressed with the results obtained that it has become routine in the office in the treatment of this disease. The relief of pain and symptoms in the large majority of cases treated by this method have been most spectacular, many of the cases reporting relief in a few hours or within the first day. A patient who came in from a neighboring city seventy-five miles away, who had previously required morphine for relief of pain, reported entire relief of pain before she reached home in her car. In the treatment of herpes zoster it has been our custom to repeat the injection in two days if necessary. In most cases at the end of this period the patients do not feel that they need further treatment, as the symptoms have usually disappeared and the vesicles have dried.

Although we have used autohemotherapy in numerous other conditions, our results have been so uncertain as not to warrant report. However, we do feel that this procedure deserves favorable mention in that group of so-called non-specific desensitizing agents, such as calcium, sodium thiosulphate and x-ray. Its use in this role in atopic eczemas and toxic dermatoses such as urticaria and erythema muliforma at times seemed of marked benefit as an adjunct. But its use in psoriasis, herpes simplex and herpes zoster has often been spectacular.

SUMMARY

(1) We have found the use of autohemotherapy a very valuable adjunct in the treatment of psoriasis.

(2) We believe it acts almost as a specific in the treatment of herpes zoster.

(3) It may be very valuable in certain cases as a non-specific desensitizing agent.

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HYPERGLYCEMIA IN SKIN DISEASES*

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My interest in blood sugar abnormalities, particularly hyperglycemia without glycosuria, as a factor in the causation of certain skin diseases was first stimulated about ten years ago by a consultation in a near-by city. The patient was suffering with a supposed Raynaud's disease, no glycosuria, but a blood sugar of 400. The patient had gangrene of the toes due to diabetes. For several years after that I frequently had sugar estimates made in cases where a disturbance of the carbohydrate metabolism was suspected. The results on the whole were disappointing, though an occasional case was found with a hyperglycemia without glycosuria. About two years ago I began to make sugar tolerance curves instead of the one estimate of blood sugar.

It is not my intention to review the literature on this very controversial subject. Ayers[1] and Pels, I believe, were the first in this country to publish their results. Since that time many attempts have been made to prove that certain definite skin diseases have their origin in a disturbed sugar metabolism. So far, no one has proven definitely that any skin disease or group of skin diseases can be connected at all times with sugar intolerance. However, articles by Rost[8] Campbell,[3] Burgess and others tend to show that sugar intolerance is occasionally the cause of skin disease. I have had made in my laboratory on office patients 270 sugar tolerance curves. From these results I am convinced that it is a valuable method in arriving at the cause of a certain number of skin diseases. Furthermore, it is my belief that all reports in which only single blood estimates have been done are of very little value and that the sugar tolerance curve should be done in all instances. It is unreasonable to conclude that a skin disease is never caused by sugar intolerance because in a series of cases run by a certain investigator only a few were thus affected. The greatest difficulty in the practice of dermatology is the paucity of lesions as compared with the exciting causes. In this branch of medicine a particular dermatological lesion may be caused by a multiplicity of agents: for instance, urticaria. So if we find an occasional skin disease caused by sugar intolerance it will be necessary for us always to bear in mind this condition as a possible cause.

There are two methods of determining the blood sugar: the so-called venous and capillary methods. In this series the capillary method has been used, as it is much more convenient where four or five tests are to be done on one patient. The arterial or capillary blood is supposed to give a slightly higher reading than the venous blood. I have had the opportunity to compare the two methods in many instances, as many of my patients who had sugar tolerance tests in the office were later admitted to the hospital. Both hospitals in Columbia use venous blood, and my readings showed very little difference from the hospital reports. The first is the fasting test, usually twelve hours after eating. Then one hundred grams of glucose are given by mouth and the test is made every half hour for the first two hours and occasionally a test is made at the third hour. The fasting level is usually 80 to 100. The peak of the curve occurs normally within the first hour and is not higher than 160 mg. In infancy it is seldom over 140 and in old age it may be as high as 200. In two hours it should be back at the fasting level. There are several ways of interpreting this curve. If the five tests done in the two-hour period are divided by five, a mean tolerance of the entire period is found. This should be in the normal individual not over 120. The other interpretation is where there is a marked delay in the return to normal. This is called a delayed tolerance and by some is considered an important finding.

In any consideration of metabolism the liver is the most important organ. Lande and Pollock showed that normal function of the liver is important in sugar metabolism. They reported three cases where gallbladder infection was the cause of typical diabetic curves and on the removal of the gallbladder normal curves were restored. Also abnormalities of the internal secretions, particularly hypo- and hyperthyroidism, frequently show abnormal sugar metabolisms.

In this connection it is important to realize that the skin plays an important part in the metabolism of sugar in conjunction with the liver. The weight of the skin is about one-sixth of the body weight, larger than the liver. Greenwood,[2 5] showed that following the injection of glucose there is an increase of sugar in the skin which usually is definitely below the blood sugar. When the blood sugar falls below the

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skin level, the sugar of the skin returns to the blood. He further showed by experiment that the skin is not a storehouse for sugar when the individual is active, the sugar tending to be used up in the process of fatigue. Other authors, in experimental work, showed that there is production of lactic acid in the skin in animals following exercise and reduced carbohydrate diet. If this lactic acid can be produced in moderate degrees in the skin by low carbohydrate diet and exercise, it may prove helpful in the treatment of certain infectious dermatoses.

Further experiments by different authors have tended to establish clearly that increased sugar in the skin enhances the growth of bacteria. Usher[10] found a fermentable reducing substance, presumably dextrose, which was increased in eczemas where sugar tolerance was lowered; second, he found human sweat to be an excellent culture medium for bacteria. The activity of the bacterial growth in sweat appeared to vary directly with the sugar content. He reported one hundred and six cases of eczema, 54 per cent showing some disturbance of the tolerance curve. Weidman found that where fungi could not be demonstrated in patients with dyshidrosis of the palm, following the application of wet dextrose, the fungi were easily demonstrated.

My investigations have shown that sugar intolerance is frequently the etiological factor in the following skin conditions: furunculosis, pyodermia, seborrheic dermatitis, dermatitis of hands and feet; and keratotic lesions of the palms of the hands and soles of the feet; seen frequently in patients past middle age. The following are typical cases from the above groups:

Case 1.—Miss H. A., 22 years old, had repeated attacks of furunculosis over a period of three years. The sugar tolerance test showed: 111, 222, 244, 222, with glycosuria three plus at the first and second hours. She was a typical diabetic, probably of the severe type, discovered only by sugar tolerance tests.

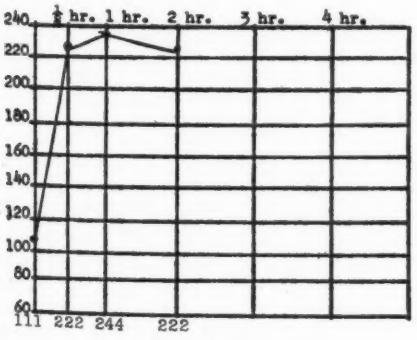

Chart 1, Case 1
Miss H. A., 22 years, furunculosis, glycosuria three plus, first hour and second hour.

Case 2.—Mr. P. P., 19 years old, weight 210, height 5 feet 7 inches, had for several years extensive pyodermia about the buttocks, thighs and groins. The sugar tolerance showed: 84, 139, 167, 143, with no glycosuria. He showed a delayed curve. The amount of sugar in the blood should return to the fasting level in two hours. This patient, on a restricted sugar diet and forced exercise in a military school, rapidly improved. The improvement in this case might have been due to the production of lactic acid in the skin, confirming experimental work which showed that animals on low carbohydrate diet and exercise produce lactic acid in the skin.

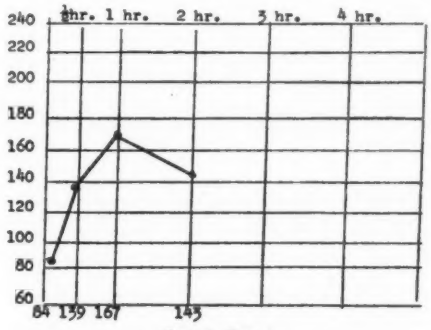

Chart 2, Case 2
Mr. P. P., aged 19, weight 210, pyodermia.

Case 3.—Mr. T., aged 65, had severe seborrheic dermatitis of the scalp, face and body for several years; no glycosuria, and blood sugar 400. The condition cleared completely with diet and insulin.

Case 4.—Mrs. E. M., aged 60, weight 220, had seborrheic dermatitis in the occipital region, back of the ears and marked dandruff in the scalp. Sugar tolerance was: 118, 200, 200, 157, with no glycosuria. Many of the seborrheic cases that show abnormal sugar curves are patients whose age, figure and dietary habits lead you to suspect a low sugar tolerance.

Case 5.—Mr. M., aged 35, athletic, complained of recurrent very acute eruption on the dorsal surface of both feet. Careful history showed that an attack followed an excessive carbohydrate meal. Blood sugar tolerance test was: 105, 170, 145, 140, 135, with glycosuria one plus on the first hour.

Case 6.—Dr. W., aged 50, was treated for years for an acute eruption on the hands and feet, recurrent and vesicular in character, often of sudden onset. Skin tests showed that he was sensitive to milk and wheat. Sugar tolerance was: 95, 143, 170, 144, 137, with no glycosuria. Restricted carbohydrate diet in both cases has resulted in complete cure. These two cases are very definite and have been followed over a period of two years and at times tested by excessive starchy diets, with recurrence.

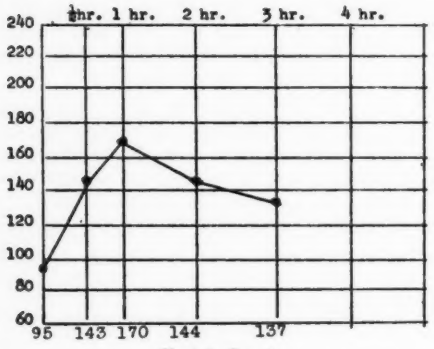

Chart 3. Case 6
Dr. W., aged 50, dermatitis of the feet, no glycosuria.

Case 7.—Mrs. P., aged 62, slightly obese, was treated for many years for recurrent eczema of the hands. Sugar tolerance showed: 137, 222, 280, 244, 256, a typical diabetic curve. If she had been tested several years before it would probably have prevented the development of diabetes.

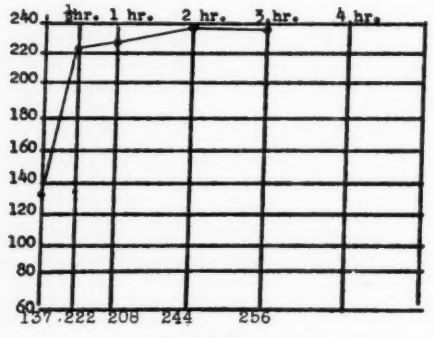

Chart 4, Case 7
Mrs. P., aged 62, eczema of the hands.

Certain keratotic lesions of the hands and feet are often due to sugar intolerance. Those of us who treat callositis (not corns) on the bottom of the feet with x-ray should be careful, for very often these patients are diabetics.

Case 8.—Mrs. L. L. F., 48 years old, complained of a painful callus on the bottom of the foot. X-ray treatment was administered to a small callositis, 2 mm. in diameter and well protected, four erythema doses. The callus fell out, but left a chronic ulcer which would not heal. Sugar tolerance showed: 112, 278, 322, 270, with glycosuria three plus. The patient was a severe diabetic and the ulcer has persisted and enlarged to the size of a half dollar, a typical diabetic ulcer and in no sense an x-ray burn.

Case 9.—Mr. W. P. H., aged 62, for several years had a thick scaly keratotic lesion of the palms of the hands

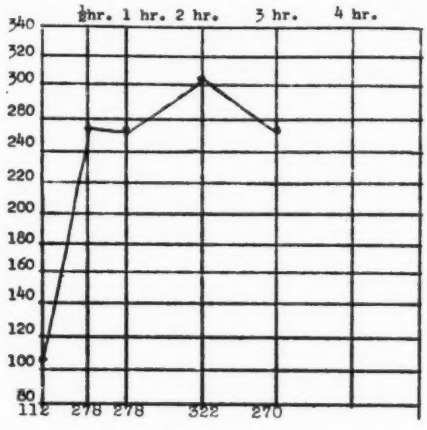

Chart 5, Case 8
Mrs. L. L. F., aged 48, callositis, glycosuria three plus.

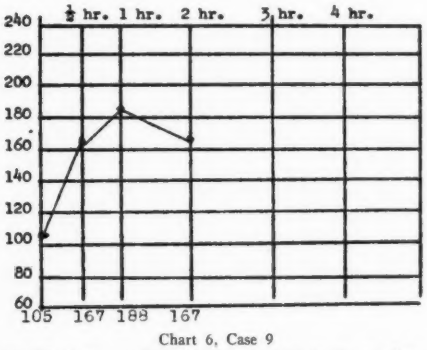

Chart 6, Case 9
Mr. W. P. H., aged 62, keratosis on both hands, no glycosuria.

which gradually increased in severity and resisted all forms of treatment. He was sensitive to leather and the condition was thought to be due to the leather which he touched when playing golf and riding horseback. He wore chamois gloves for a long time without improvement. Sugar tolerance test showed: 105, 167, 188, 167, with no glycosuria. This is a typical diabetic curve. There was marked improvement on dietary treatment.

CONCLUSIONS

Investigations of this type would be of more value if a second tolerance test were made after a period of treatment. However, it is very difficult to persuade patients to go through this test the second time. The number of early diabetics discovered by this test is sufficient to warrant its frequent use.

If the accepted normal sugar curve is correct, and if certain skin diseases are not in themselves capable of causing a disturbance of the

carbohydrate metabolism, then my findings certainly indicate that sugar intolerance is a factor in the causation of certain dermatoses. Therefore it seems reasonable to conclude that a certain percentage of the cases of furunculosis, pyodermias, eczemas, acute dermatitis and keratotic lesions are caused by sugar intolerance; and that they are sufficient in number to make the sugar tolerance test an important aid in the diagnosis and treatment of these dermatoses.

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DISCUSSION (*Abstract*)

Dr. F. J. Eichenlaub, Washington, D. C.—That an excess of blood sugar, and especially diabetes, may have an influence on the course of many individual cases of various dermatoses seems beyond dispute. I feel, however, that we must distinguish sharply between hyperglycemia in the diabetic and in the otherwise normal individual. After all, the diabetic has a general constitutional disease, with changes not only in the pancreas and liver, but often with associated arteriosclerosis and nephritis, and probably other changes in the endocrine system. Such diseases as hyperkeratoses are probably due to the vascular changes rather than to the hyperglycemia *per se*. The same is undoubtedly true of ulcers and gangrene.

On the other hand, in the normal individual, an excess of glucose may be desirable in some conditions. I have found the intravenous injection of glucose, as suggested by Tauber, of value in furunculosis and carbunculosis, in toxic erythemas and in urticaria. Where there is a true diabetic tendency, restriction of carbohydrate intake will be valuable. On the other hand, the benefit derived from such treatment should not make us lower carbohydrate intake indiscriminately, as this may do our patients more harm than good.

I do not wish these remarks to disparage the work or results obtained by Dr. Allison. I hope he will continue it further to clarify the situation.

Dr. Isaac R. Pels, Baltimore, Md.—We cannot repudiate the fact that food and drink play some as yet poorly understood part in the production or aggravation of certain cutaneous diseases. Whether this is a constant relationship in certain diseases should of course be determined by further studies. But I do not believe it to be true. Everyone has experienced the disappointment of restricted carbohydrate diet in the therapy of certain diseases. Highman pertinently stated in discussing Tauber's paper that it is surprising how many patients having diabetes or other metabolic diseases exhibit no cutaneous changes.

It is a trite statement that the individual refractory case requires a special laboratory investigation; and that the management of the case should be based on these findings, well and consistently checked in their relation to other chemical values. As a corollary to this thought, and in the light of positive pathologic findings as indicated by Dr. Allison, it is suggested that a study be made of the carbohydrate metabolism of similar dermatoses, irrespective of the effects of topical medication. This would answer the doubting observer's query regarding proper control studies. Such a study evokes at once the problem of individual metabolism in disease, discussion of which would be both difficult and perhaps irrelevant.

Furthermore, it would be interesting and valuable to know how the changes in clinical disease influence this glucose tolerance; and how the reciprocal relationship of cause and effect can be understood in order to guide us in therapy. Dr. Allison and Dr. Goldsmith both allude somewhat to this.

Twenty years ago, simple estimation of blood sugar values by different methods in the hands of different investigators varied considerably. This was an unsatisfactory situation.

But the problem of hyperglycemia was not put aside because as stressed in this paper an estimation of glucose tolerance gave a new significance to the correlation of certain dermatoses and carbohydrate metabolism.

This more exacting type of survey applied to the unmanageable cutaneous disease has naturally aroused much critical comment. The conclusions of Fisher, Tauber and other workers, together with the critical survey of Goldsmith, apparently leave the situation without any decided unanimity that hyperglycemia causes certain dermatoses. Here again arises confusion with regard to methods of study, and particularly with regard to controls.

We have no method of evaluating the worth of such studies. Nevertheless, from all the variations in blood sugar estimations there appear certain facts which command attention, inasmuch as therapeutic success has evidently been achieved when based on these abnormal findings. In this connection the present report by Dr. Allison assumes some real importance.

As practitioners in dermatology, therefore, we are impelled to reinvestigate the problem of hyperglycemia in certain dermatoses which are refractory to our present methods of management. Dr. Allison's apparent plea for this reinvestigation brings to mind certain comments, however, which I have stressed.

Finally, the essayist is to be commended for his courage in bringing up a much belabored subject. Certainly his individual experience in the successful management of his patients sets a worthy example for the dermatologist, who must exercise a nice judgment in the management of diseases intractable to ordinary procedures. It should make all of us assent to a more careful consideration of the patient's general health rather than to a more determined attack upon his cutaneous disease.

Dr. H. H. Hazen, Washington, D. C.—I regret that I have been unable to obtain any practical aid from blood sugar examinations. However, I feel very strongly that from a clinical standpoint a reduction in carbohydrates frequently produces marked improvement in seborrheic conditions.

Dr. Howard King, Nashville, Tenn.—The essayist referred to treatment of calluses with x-ray on the feet of diabetics. I think the use of x-ray for the treatment of calluses or corns is a very dangerous thing and should not be advised, as the most it will do is usually temporarily to remove the callus, causing the patient some relief, and he may return later, urging repetition of the treatment. This, of course, is a very dangerous thing; it may lead to very serious trouble.

Dr. Allison (closing).—This is a very controversial question. It has never seemed reasonable to me to conclude, as others have done, that a low carbohydrate metabolism causes skin diseases. Giving glucose intravenously in the presence of carbuncles and furuncles seems to me to be against all clinical evidence. There may be instances where a definite glandular disturbance has caused a very marked increase in the sugar tolerance, that is, where the sugar curve is always low due to the glandular disturbance. I have seen two such cases and concede that they might be benefited by administering extra sugar. They are, however, the exceptions.

Investigations of this character seem to warrant the conclusion that a disturbed carbohydrate metabolism is in many instances associated with the dermatoses named in my paper. The investigations are preliminary.

As to the danger of x-raying for callositis: it is my policy to x-ray areas so small and so well protected that damage never occurs. It is not my policy to x-ray corns.

EVALUATION OF MODERN THERAPY IN DIABETES MELLITUS*

By ARTHUR A. HEROLD, M.D., F.A.C.P.
Shreveport, Louisiana

A paper of this scope would not be complete without reference to past therapy and a summary of the ideas of the best clinicians as to the merits or demerits of the various preparations advocated in the treatment of this disease, which has been recognized as a clinical entity since the days of the famous Egyptian Papyrus Ebers of approximately 1,500 years B.C.[1]

It is interesting to note the many therapeutic measures and drugs which have been recommended and used to reduce hyperglycemia or to clear up, in part at least, glycosuria. For centuries, in some parts of Hungary, the peasants have known that a decoction or tea of certain blueberry leaves helps the polyuric; on this information, Dr. F. M. Allen, in cooperation with his chemist, has experimented with the preparation, which he has named myrtillin and which has been placed on the market. While no extravagant claims have been made for it, it has been found to be of some value in preventing the rise of a normal blood sugar. Along similar lines, Dr. E. A. Bertucci[2] has recently reported definite lowering of hyperglycemia with a preparation made from the thistle.

For many years there has been a tablet of yeast on the American market and much has been claimed for it. I recall an associate, with whom I officed in the early days of my practice, himself a diabetic, who claimed to have noted beneficial effects from it, both personally and in his practice. A few years ago, German manufacturers flooded the market with many such preparations, but they do not seem to have made an impression. However, Joslin, in his book on treatment, mentions that "a substance similar to insulin has been prepared from yeast by Winter and Smith and from various vegetable sources by Collip." Prof. von Noorden,[3] in his lectures delivered in this country in 1905, stated:

"About fifteen years ago Prof. Binz and Dr. Graser discovered that the fruit of the East Indian plant, *Syzygium jambulanum*, possesses the property of strongly reducing phloridzin diabetes. * * * I have, myself, employed and studied the effect of jambul preparations on cases of severe and slight diabetes; the results showed that, in some cases, a marked effect on the glycosuria was, without doubt, actually obtained."

It may be mentioned as of historical interest that von Noorden[3] mentions as the drugs most potent in diabetes, as considered in 1905, opium and its alkaloids, salicylic acid and similar substances (including aspirin) and antipyrin. Joslin,[4] also, in an early work, while deprecating the too ready use of drugs by the profession, mentions opium and aspirin and concludes:

"Organic preparations made from the pancreas and the pancreatic gland itself have been frequently employed, but thus far (*mark the words*) the data do not appear to me to warrant a continuance of their use. * * *"

Does it not seem from this that he had a premonition of the oncoming of insulin?

Numerous glandular or pseudo-glandular preparations have been and are still being marketed with the claim that, as they contain the extract of the islet tissue, as well as (or without) the rest of the pancreas, they will supply what the diabetic lacks if properly taken. An enteric-coated tablet has been marketed which is cer-

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*Read in General Clinical Session, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

tainly more rational, but, if any of these have helped, except in that they supply what may be lacking in enzymatic secretion of the gland, it has not been proven; a few clinicians think that they have seen some benefit from these preparations when used as an adjunct to insulin therapy.

A few years ago, German investigators brought out several preparations which they thought would prove to be oral substitutes for insulin, notably synthalin, neo-synthalin and glukhorment; in fact, so well were they received that Prof. Frank, of Breslau, under whose supervision synthalin was first produced, received the Nobel prize in medicine in 1927 for his work along this line. Although there has been reported some similarity in effects of synthalin and glukhorment, in that the lowering of blood sugar with them is due to the guanidine or guanidine derivative contained therein, my personal experience is limited to the first-named preparation. My information is that neo-synthalin, intended to be an improvement on the original product, in that it is less toxic, has turned out to be much less effective. The objection to the use of synthalin has been that, if continued over a long period of time, serious gastro-intestinal disturbance might be produced; it is partly on this account and partly because of difficulty in obtaining it that I have not used it more often. In my limited experience no gastro-intestinal irritation was observed.

Case 1.—A. H., aged 6, had diabetes of four years' duration, during most of which time he had been on insulin therapy. A tablet of 0.010 gm. synthalin was given two nights in succession and omitted every third night. The patient developed some manifestations of hypoglycemia about fourteen hours after administration of the drug. This stopped after reduction of the morning dose of insulin. No gastro-intestinal disturbances resulted.

Case 2.—C. S., aged 37, had diabetes of nine years' duration. He has used insulin somewhat irregularly for the past four years. A tablet of 0.025 gm. synthalin was taken twice daily for two days and omitted on the third. He was able to reduce insulin materially, but finally quit the synthalin, as he said that the reducing of blood sugar made him weak and he did not know how to control it as he did with insulin dosage. No gastro-intestinal symptoms occurred.

Case 3.—S. C., aged 6, had diabetes of six months' duration, during most of which time she has been on insulin. She took 0.010 gram for three nights, then skipped one night. Results were the same as in the first case and there were no gastro-intestinal symptoms.

Case 4.—Mrs. V. I. M., aged 52, has had diabetes for over a year, getting progressively worse, and has persistently refused to take insulin. When first seen her fasting blood sugar was 411 mg. She was advised as to diet and general care (including extraction of carious teeth in pyorrheal pockets) and given a certain enteric-coated tablet. She returned in ten days and exhibited a blood sugar of 511 mg. She was then put on two tablets of 0.010 gram synthalin daily for three days, omitting them on the fourth day; after taking 50 of them and observing the same diet, her blood sugar fell to 234 mg. and, following extraction of all teeth, to below 200 mg. She had no gastro-intestinal symptoms.

This patient has a very high renal threshold, with some nephritis, not showing glycosuria unless the blood sugar exceeds 300; therefore, it is impossible to follow her without blood sugar readings. On account of cardio-renal complications, she is now taking insulin, but has requested that I secure some synthalin for her, as she prefers it.

The Germans have put out another substance called "anticorman" (decamethylene - diguanidine bitartrate), but recent investigations[5] in this country, from mice experimentation, tend to show that only toxic doses produce any hypoglycemic effect. We are not sufficiently familiar with it to make any further comments at this time.

And now we come to the greatest boon of them all. Joslin has divided the study of diabetes mellitus into three eras, which he calls: (1) the Naunyn era, after that great German scientist and investigator, who put the proper handling of the diabetic patient on as high a plane as was possible, considering the limited knowledge of the disease in his days. (2) The Allen era, after our learned contemporary, who dared to suggest and put into practice what many feared would be fatal to diabetics, namely: the fasting of the toxic and the acidotic case by gradually withdrawing the fats, then the proteins and, finally, the carbohydrates, and then gradually building up, adding, last, the fats, the food element which so many considered indispensable and least harmful to the patients. (3) The Banting era, after that patient and persistent Canadian, who with the aid of his assistant, Best, and his advisors, McLeod and Collup, gave us the long-sought insulin, thereby giving new hope for a normal span of years to the large army of diabetics throughout the world.

It is needless and, indeed, it would be superfluous, for me to stress before an audience like this the need for continued care and regulation of diet in the presence of insulin therapy. I beg your permission, however, to mention the one feature that has, in the last few years, come largely into vogue: the high carbohydrate-low calorie diet, thereby reducing the intake of fats and attempting to stimulate normal internal se-

cretion of the pancreas. In this way it is believed that diabetics are kept in better general condition and the premature arteriosclerosis, formerly common, greatly retarded. Some workers, for example, Sansum of Santa Barbara, carry this to the extreme of giving liberal calories, with high carbohydrates and ample insulin, claiming that, eventually, there may be a larger reduction of insulin dosage than were the carbohydrates kept low. Joslin preaches liberal (though not excessive) carbohydrates and warns against the danger of too high fat proportion. Thomas and Howard, of Baltimore, are strong advocates, while Allen has always contended that "total calories count more than amount of carbohydrates." Rabinowitch,[6] of Montreal, has contributed considerably to the literature on this point, his arguments being both theoretical and practical. He describes his experiences with both mild and severe cases, many of whom avoid taking insulin. He claims less cardiovascular complications, which might be attributed to lower percentage of fats in the diets; he argues that we should consider the utilization of insulin rather than its secretion and cites the frequent failure of large doses, given by needle, in the presence of infection, to show that there are vague factors in the system which either destroy the secreted insulin or so modify it as to render it inert. The partial solution of this enigma may be in the other works of Rabinowitch and his associates on an "insular hormone" in the duodenum. Briefly, they call attention to what appears to be an insulin-producing or insulin-provoking hormone in the duodenum, as an extract of healthy duodenum will invariably lower blood sugar in partially depancreatized dogs, whereas it will have no such effect if the pancreas has been completely removed. In closing one of their papers they[7] say:

"It would appear, from these experiments, that a substance exists in normal duodenal mucosa which has a stimulating effect upon the islets of Langerhans; in other words, an insular hormone. This, coupled with Workman's observation (he found in 1906 pronounced hypertrophy of duodenal mucosa in cases of diabetes mellitus which came to autopsy), introduces a new factor into its etiology. Insular failure may result from excessive stimulation of the islets by duodenal hormone produced as a result of sugar intake over long periods. Secondly, inflammatory conditions in the duodenum may lead to a deficiency in the hormone, followed by a diminished activity in the islets themselves, resulting in an hyperglycemia."

I[8] have seen cases of jaundice, with gastroduodenitis, show a transient glycosuria and I am sure that this is a common observation.

The experiments of Soskin at Michael Reese Hospital in Chicago may be the means of leading to new therapy. He has shown that, whereas depancreatized animals may be kept alive and sugar-free on liberal insulin dosage, this is an impossibility in even partly dehepatized ones.

Now, ever since the boon of insulin has been generally recognized, investigators have been attempting to improve upon it in various ways. About three years ago, Dr. Joslin said that the time was ripe for "something new" in the diabetic line, but he did not amplify his remark; whether or not he had advance information on what was being done in Denmark, we do not know. Certain it is that Hagedorn and his coworkers in Copenhagen have made a valuable contribution to diabetic therapy, in that they have worked out the preparation of "protamine insulinate," which gives us a more exact "substitution therapy" than the plain insulin, as it more nearly imitates nature by its prolonged action. As has been published for the medical profession, these Danish workers reasoned as follows:

"When treating diabetes with insulin, one has to replace the regulated continuous secretion from the normal pancreas into the portal vein by a few daily injections into the subcutaneous tissue. This method is of course only a poor imitation of nature's own mechanism. Serious disturbances are avoided only because the organism has other means of regulating the blood sugar than to vary the rate of insulin secretion.

"This is the reason why treatment with one or two injections daily is found to give fairly good results in many cases. In more severe cases, however, very pronounced oscillations of the blood sugar may occur. During the last few hours before the injection metabolic disturbances develop, which tend to minimize the available deposits of carbohydrate, strongly needed when the blood sugar runs low after the injection.

"If the rate of absorption could be retarded, the aforementioned difficulties might possibly become greatly reduced.

"In order to obtain such a retardation, different ways have been tried:

"(1) Injecting the insulin as a suspension or emulsion in oil or similar substances, e.g., Leyton in 1929.

"(2) Injecting it together with vasoconstrictor substances (experiments in the Deaconess Hospital, Boston).

"(3) Injecting an insulin compound, sparingly soluble in the tissue fluid.

"The third method has been tried through several

years in this institute, but without success, until experiments made for other purposes indicated that a compound of insulin and nucleic acid had a more acid isoelectric zone than in insulin itself. According to this experience it appeared that it might be possible also to combine the insulin with some basic group, so that the combination might get its iso-electric zone nearer to the pH of the tissue fluid than the insulin hydrochloride.

"In a compound of this type the insulin should act as an acid, while in insulin hydrochloride it acts as a base."[9]

Through the courtesies of Eli Lilly & Co. and E. R. Squibb & Sons, the writer, as well as many other clinicians in this country, has been enabled to carry out clinical investigations with protamine insulinate, pending decision as to whether or not it will be marketed commercially. Numerous ways of giving it, alone or along with doses of regular or standard insulin, have been suggested. In my own limited experience, I have found that the best results have been obtained by giving the regular insulin in the mornings and the protamine soon after the mid-day meal. I find that, as has been suggested by some, if I give them both before breakfast, while we obtain a very satisfactory result for that day (the protamine effect apparently following the passing off of the sugar-reducing effect of the regular preparation), still, the next morning, both have worn off and the morning blood sugar rise is marked; and, on the other hand, if we wait until late afternoon or evening to give the protamine, we have no hypoglycemic effect that night; the happy medium, then, for those requiring two doses per day is as mentioned above.

We cannot leave the subject of modified insulin without referring also to crystalline insulin. It will be recalled that, about five years ago, Prof. Abel, the eminent chemist and investigator of this great city, succeeded in isolating the active principle of insulin, which he reduced to a crystalline substance. Many, at that time, thought that this would revolutionize therapy, but its greatest boon, as we see it now, is that it is invaluable in that small group of cases which exhibits an allergic reaction to regular insulin, whether it be from beef, pork or other pancreas. These cases tolerate solutions of crystalline insulin well. It is being used also in regular therapy and, according to Freund and Adler,[10] who seem to have made extensive investigations,

"It is more rapid in onset of action and shorter in the duration of its effect on the blood sugar level, in contrast with protamine insulin. Its action on the blood sugar level lasts for a period of from eight to nine hours and returns slowly to its normal level. The number of doses and amount of insulin required to control the blood sugar level is reduced as compared to the use of standard insulin. It is similar to standard insulin in that it is a stable compound and is dispensed in a single solution."

Protamine preparation has recently been fortified with zinc and calcium, either of which seems to increase its stability and adds to its effectiveness, according to those producing it.

A recent expression from Dr. Joslin[11] on this subject is apropos:

"Protamine insulin is here to stay and it is a boon to diabetics. Improvement in the protamine insulin has already been announced, so that it is now necessary to designate "regular" protamine insulin in contrast to protamine-zinc insulin. By adding zinc and calcium compound to the protamine insulin formula," affirmed Joslin, "the insulin product will maintain a better suspension at room temperature. Even without refrigeration, mixtures of protamine insulin will keep for two weeks surely, possibly months.

"The great advantage of protamine insulin is in the simplicity and convenience of its administration. Because it continues to act over a long period of time (more than 24 hours), only one or two daily doses of protamine insulin are needed in cases where two, three and four injections of regular insulin were formerly required. Cooperation of the patient is much more readily attained."

Joslin therefore looks for an increase in the number of diabetics taking insulin (protamine insulin), and a significant decrease in the number of deaths from diabetic coma. He also confirms the early hope as to the safety of protamine insulin; it engenders fewer and less severe insulin reactions.

The use of protamine insulin, believes Joslin, makes possible a closer approach to the ideals of diabetic treatment, though it does not do away with any of the regulatory essentials in the management of diabetes. Diet and exercise are still necessary; overeating must be avoided. The only bad reaction which Joslin has noted with protamine insulin occurred in patients who neglected to adjust their (1) insulin dosage (which usually should be lowered), (2) their diet, (3) and their exercise after they were discharged from restful hospital existence to the much more strenuous life outside.

The indications for the use of protamine insulin, and "it is desirable to use protamine insulin more extensively," says Joslin," are to be found

particularly in the following types of diabetic cases:

"(1) Those of recent onset; (2) those with high fasting blood sugar values; those in which occur (3) sensitivity to regular insulin, (4) hepatomegaly (Hansen reports reduction in the size of the liver with protamine insulin), (5) lipodystrophy, or (6) hyperlipemia; (7) mild cases; and (8) cardiac cases in which hypoglycemia must be avoided."[11]

This resumé of evaluation of diabetic therapy would certainly be incomplete were we to stop here. It behooves us to say something of investigations along other lines now going on and the possibilities of their bearing on future treatment. The well-known fact that autopsies on even severe diabetics do not, as a rule, reveal pancreatic disease; the observations frequently made that the liver damage caused by overdoses of insulin with hyperglycemia, together with the work of Soskin above referred to, the investigations and opinion of Rabinowitch and his coworkers at Montreal, as well as the follow-up of Harris of Philadelphia, and other clinical and pathological workers of whom we are not hearing at present, all these prompt me to ask the questions: is substitution therapy, as practiced by injecting insulin, the *sine qua non?* Is it not only of temporary value in the moderate and severe cases? Is it not actually harmful in many, especially in juvenile cases, by resting the islet tissue too much? And, even though we more nearly approach nature with the protamine preparation, have we reached the real goal in diabetic therapy? I believe not, and I venture the prediction that not until we have found how to control the glycogenic function of the liver and, in addition, perhaps, how to regulate the natural secretion of insulin, will we have reached Utopia in diabetic therapy.

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PREVENTIVE PEDIATRICS*

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In discussing the subject of preventive pediatrics one should in the first place recall that the health of the soil in which human seed are seriously planted is a matter of great importance and one which should receive practical medical consideration. Already an occasional woman who has been educated along the lines of prevention goes to her physician for an examination before she embarks on the voyage of pregnancy. If physicians seriously undertake these examinations and strive to apply modern knowledge concerning them, and at the same time by their work and comments impress their patients with the importance of examination, then other women will readily be added to the ranks of these pioneers seeking basically sound preventive care. And thus will there gradually develop here an increasing practice similar to what has occurred in the field of prenatal care, where year after year more and more women apply earlier and earlier during pregnancy for medical supervision.

In other words, the care of the child definitely begins during the preconception and prenatal periods, for it is only during these periods that some of the most effective preventive pediatrics can be carried out. For example, it is here that one prevents congenital syphilis. With present day facilities, except for ignorance and neglect, we should rarely see a child born with syphilis. Likewise, children would be born with a much better nutritional foundation if those who look after pregnant women would more carefully apply the available information concerning diet during pregnancy rather than, as is so often the case now, merely say "Just eat a good general diet," that is, if diet is mentioned at all. Still further, we all know that there would be fewer children born prematurely, dead, or injured at birth, if good prenatal and delivery care could be made more extensively available.

After the child is born many difficulties could be eliminated if careful supervision were started immediately. He should be examined as early as possible (preferably within the first few hours) to see whether or not he is in "good running order," just as one wants to be assured

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of this fact when one buys a new car. In the case of the child, however, one has to accept him whether he is satisfactory or not, and what is more, he cannot be traded in later for a new one. So, it is important to know very early as much as one can about him so that his progress may be guided in as healthy a direction as possible. He must have adequate fluids, and must eat, gain, and grow. In fact, these are his chief functions during the first six months or so, and therefore the most important preventive measure during this very sensitive period of rapid growth and development is the prevention of poor nutrition. In attempting to maintain good nutrition one cannot rely entirely on the adequacy of any kind of milk unless its frequent deficiencies are corrected by the addition to the child's diet of cod liver oil and orange juice, or good substitutes for them. These essential food factors we add routinely, and begin them within the first two or three weeks.

Going a step further, even milk with the deficiencies corrected as indicated above, becomes inadequate as the sole article of diet after three to five months, so it becomes necessary to begin the addition of other foods about that time. One gradually adds other articles of diet as the months pass, so that by the time the child is ten or twelve months old he is eating essentially the same diet he will eat the remainder of his life. However, since during this early period he is much more sensitive, is growing and developing rapidly, and is less resistant, the food must be much more carefully prepared, the diet must be more carefully balanced, and the food and fluids must be guarded more carefully against contamination. As the child is given more of this additional food, milk assumes a less prominent place in his diet and should definitely become of secondary importance by the time the child is a year or fifteen months old, if healthy growth and development are to be maintained.

Also, during this first period there are other preventive measures which are important. In discussing these I shall outline my own policy and procedures and mention some of the reasons on which they are based. In the first place, I vaccinate against smallpox between the second and third month for the following reasons: the child is not immune; reactions at this early age are less severe than later; he is kept in his crib during this period and there is less apt to be serious contamination; he is incoordinate and therefore cannot possibly contaminate by scratching; in my opinion he is less subject at this early age to the occasional serious complications of central nervous system involvement; and probably just as important as any of the others is the fact that if one carries out at this early age this probably most dreaded immunization, afterwards one finds that the mother is most grateful and offers little or no resistance to the later immunizations. After this first immunization is completed, I have heard many mothers emit a sigh of relief and say, "Thank God, that's over with." While if smallpox vaccination is delayed, it is always hanging over them as something that must be done eventually.

The next specific immunization to be mentioned is that against diphtheria because it is often given at six months. I now give alum-precipitated toxoid in one dose at that time usually without first doing the Schick test. However, since we have found children still with a negative Schick test at six months, it would probably be wiser, if one is attempting whooping cough immunization, to give those inoculations at six months and the diphtheria immunization later, especially since whooping cough is more dangerous to the child at this age than there is likelihood of his contracting diphtheria. This, I think, is especially true where there are older children in the family. Whichever time is selected for diphtheria immunization, it is my policy to give the Schick test six weeks to two months later and every year or two thereafter until the child enters school. After three or four years of negative Schick tests one is not apt to get a subsequent positive. At least, that has been true in my limited experience.

The third immunization I attempt is against whooping cough at about eight or nine months, provided this time has not been exchanged with diphtheria immunization as indicated above. I am not maintaining that whooping cough immunization should be advocated by health officials since certainly it is not as reliable as the others, but most of us pediatricians employ it, explaining to the parents that it appears to have some value, but that it is not on the same plane as are the immunizations against smallpox, diphtheria, and typhoid fever.

The fourth immunization I give is that against typhoid and paratyphoid fever. These diseases in our section of the country are still sufficiently prevalent to make it seem advisable to immunize against them routinely. This immunization is carried out before the child passes into his crawling and walking and putting-dirty-things-in-his-mouth summer. Hence, this vaccine is usually given by the time the child is a year old and sometimes a little before. While I have seen

several children with typhoid fever or paratyphoid fever during the first year of age, it should be understood that I do not give this immunization at this time entirely because the child needs it, but it is given partly because of the beneficial effect it has on the mother. Thus, in the first place it concludes the various immunization procedures during the first year, during which period the child is receiving the mother's intimate concern, and anything done then has a more profound educational value. In the second place, there is practically no reaction to these inoculations given at this early age, and because of that, subsequent necessary periodic immunizations against typhoid meet with no resistance on the part of the parents.

From the preceding remarks it will be seen that the child receives rather intensive care during the first year, which period covers that of his most rapid growth and development and therefore constitutes probably his most sensitive or most vulnerable period. Having followed the child's nutrition carefully during this early age, and having demonstrated to the mother what can be accomplished in that regard, and having carried out the specific preventive measures during this period when they are most effective for the child and at the same time produce the most profound impression on the mother or the parents, we have secured an educational value through demonstration which is apt to be lasting in the minds of the parents. As a result of this many are sufficiently educated and stimulated to move under their own impetus and ask for this sort of care, while in other cases it becomes possible for us to get important and necessary things done subsequently not only without much resistance on the part of the parents, but on the contrary often with enthusiastic interest.

There is still a fifth procedure which is important not as an immunization but because of its preventive significance. It was not discussed with the above procedures because its more frequent application comes during the years beyond infancy. The subject in mind is the tuberculin test. Children found positive during the years before they enter school, in most instances not only can be prevented from developing actual tuberculosis, but also serve as an excellent lead or epidemiological approach to the source of spread. Without time or space for discussing this important subject in detail we may say briefly that there seems to be adequate reason for advocating the gradual adoption of the tuberculin test as a routine measure for the preschool child. Of course communities must be prepared beforehand through education for its acceptance, and it should be understood that the tuberculin test is only the first step in this particular approach to the prevention of tuberculosis. The positive test should be accompanied by or followed with the additional well-known diagnostic procedures (including x-ray) which are necessary to reveal its true meaning in any individual case. The tuberculin test and its associated procedures of course can be used advantageously at other ages of childhood, especially at the beginning of adolescence, as well as during the years before the child enters school.

Before proceeding to a more general discussion, it should be recalled emphatically that there is an important phase of preventive care concerning a form of health which is quite as important as that of physical health and is just as much a general medical responsibility as is the problem of physical health. I refer to the subject of mental health. Time will not permit of an extensive discussion of the preventive aspects of this problem, but suffice it to say that there is in general almost as specific information concerning the prevention of poor mental health as we have concerning the prevention of poor physical health. The chief difficulty at present in securing broad medical assumption of this responsibility is that medical schools have failed to teach physicians and stimulate their interest in this sort of preventive care. Another difficulty is that while the indications for building mentally adequate human beings out of infant material can be made clear, accomplishment is difficult and the methods are not tangible as they so often are in the physical health preventive problem. I feel sure we can say that today the mental health problem presents a more serious outlook than does the physical health problem, since the former is becoming worse every year in contrast to the gradually improving situation in the physical health problem. This, it seems to me, offers a definite challenge to the medical profession to concern itself seriously with the formulation and institution of basic preventive activities in this field with the purpose of eventually changing the tide of this serious trend.

Returning to our previous discussion, since the various procedures which I have outlined above, or similar ones, are those which we, whose chief responsibility is the health of children, employ for our own children and our patients and have found highly successful, then should it not be our responsibility to work toward the extension of this sort of care to all children? The point I am

trying to make is that public health practice as it concerns children, to be most effective, should be started intensively dating from birth rather than from the time a child enters school. If my or your child had his health supervised during the first five or six years as I have indicated above, then it would concern us very little if our children never received a health examination at school.

I do not mean by the above remarks that nothing has been accomplished in the school health work, for on the contrary all school health work has had its value in that we may in any educational program first have to make a demonstration or a noise to get attention. But getting attention is not sufficient, for the chief value of any health program lies in what is accomplished after the attention is secured, and certainly the most profound or enduring form of education is that resulting from the demonstration of actual accomplishment. Having secured the attention and interest in the health of children, then, has the time not now come for us to begin gradually to push actual accomplishment back in the earlier years before school when it is much more valuable to the child and has much greater educational value to the parents? Before school the health of children is the parents' responsibility. After entering school this responsibility often is shifted to the school, as indicated by the fact that as I ask parents of school children whether or not this or that immunization has been done, after much hemming and hawing, they say, "Now, let me see. Yes, something was done at school. Yes, they gave him some sort of shot, but I don't know what it was. I'll have to find out." On the other hand, if the immunization is given to the infant or younger preschool child, it is almost certain to have been given in the presence of one or more of the parents and they are much more apt to know what it was.

I am not suggesting that school health work be discontinued, but what I am trying to emphasize is that if these important child health procedures were carried out during the years before the child enters school the children would enter school with much less need for careful individual health supervision in the schools, and more time could be employed in the school for carrying out broader health training as a part of the school curriculum. Also the teacher would eventually be educated to be as interested in the health of her children as in their other activities in school, and she like the mother could call the physician's attention to this or that child who seemed not to be doing well. Thus, much time and effort could be salvaged from the present indiscriminate and often unsatisfactory school health examinations which mount up into many thousands.

Of course any policy looking toward the individual care of children from birth offers difficulty. It is much more difficult to see that a hundred children scattered around get individual care than it is to round up a hundred children in one group and do things to them, but the former method, it seems to me, is absolutely necessary if we are to build on a firm foundation toward the accomplishment of the best results. It will mean that these children will have to be cared for largely by practicing physicians. It will mean that many of these physicians will have to receive more instruction to do this work in a fairly satisfactory way. Plans for this sort of training for physicians are being formulated all over the country through the cooperation of the Children's Bureau, state health departments, state medical associations, and the medical schools. Such a development will have to be gradual and will require a great deal of patience on the part of all, and the whole procedure of getting children cared for in the early years before they enter school is so undramatic that it will be difficult to educate the politicians to accept any financial responsibility involved.

It seems to me, however, that any accomplishment along this line, however difficult, has such profound importance that it will be worth more than the effort expended. I mean by that just this. Carrying out such procedures will mean that practically every child cared for will cost those responsible (the parents usually) either money or effort and most of us human beings place little value on things obtained which do not cost money or effort. In other words, I feel that one of the greatest dangers in the recent trend of public health work has been the danger of pauperization of the recipients of public health benefit and in the cheapening in their minds of these valuable procedures. We who are enthusiastic because we know the great value of this work are apt in our enthusiasm to take to or, broadly speaking, give away these things of value because we know all should have them, but certainly we pauperize the recipient and cheapen the procedure if we do not require money or effort in return. Rarely is it impossible for the layman to get to the doctor or to town for anything he really wants. Likewise, rarely should it be impossible for him to dig into his pocket or get up on his feet and walk for these things

that we ourselves know and he should be taught are often more valuable than the things for which he at present spends money or effort.

The eventual and probably distant result of all of this would mean that every child entering school would be required to have a sufficiently comprehensive health examination (mental and physical) to determine where he should be placed in school and how he should be taught in school to get the best results out of the valuable facilities which the school provides for his education. It would be just as necessary for him to be examined in this way before entering school as it is now necessary that he go to school. Already we have examples of the importance of this in the more advanced schools. Under such requirements the parents would, even back in his early childhood, become concerned about his mental and physical health, just as they now in his early years become concerned about his going to school when he is six years old or earlier. Likewise, physicians knowing that the chief burden of child health care during the first six years rested on them and knowing the necessity for a comprehensive health examination of the child before he entered school, could be more easily stimulated and educated to assume this responsibility with a higher level of accomplishment than prevails at present.

DISCUSSION (*Abstract*)

Dr. J. H. Mason Knox, Jr., Baltimore, Md.—Dr. Casparis has outlined for us some of the things that can be accomplished through preventive pediatrics. The object sought in preventive pediatrics is that all babies should be well born and healthfully reared. To bring this about more attention will have to be paid to securing:

(1) Healthy parents. The pediatrician first sees the unfortunate products of ill-considered mating. Much of his time is devoted to the attempt to repair goods already damaged. Medical science cannot assure that children of parents thought to be free from disease will be normal, but certainly the number of feeble-minded and infected children may be reduced if all persons contemplating matrimony can be assured by competent medical authority that they are presumably free from conditions that may be passed on to their children.

(2) Care of the expectant mother. Preventive pediatrics also includes prenatal care of the mother and clean, skilled obstetrics. When one considers that half of the total number of infants born alive die in their first month and in addition to them there are many babies stillborn through the condition of the mother or through difficult obstetrical procedures, it is quite evident that the care of the expectant mother before, during and after delivery is an important part of preventive pediatrics.

(3) Medical supervision. The new born infant needs medical supervision, including physical examination, direction as to its feeding and routine care, protection from communicable diseases, respiratory, gastro-intestinal, tuberculosis, and so on, and, of course, protection against smallpox and diphtheria. Periodic examination of the infant should lead to early detection of disease such, for example, as syphilis or cretinism, at a stage when treatment may be more effective. It is also important that all deviations of a child from normal conduct should be detected at the earliest possible period. This kind of medical supervision is at present furnished by many family physicians, obstetricians and pediatricians with satisfactory results. What is needed particularly is that the advantages of this intelligent and supervising care be extended through community action and through the cooperation of physicians and health officers to all women and children who are not able to have this service for themselves.

THE GENERAL PLAN AND OBJECTIVES OF A MATERNAL AND CHILD HEALTH PROGRAM*

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In attempting to outline the general plan and objectives of a maternal and child health program, I shall submit to you a summary of the programs actually in operation in the several states, as indicated in the plans and reports of activities submitted by the state health departments to the Children's Bureau.

Following the approval in February, 1936, of the supplemental appropriations act, funds became available for grants in aid to states for maternal and child health services under title V, part I, of the social security act. These first grants were for the five-month period ending June 30, 1936. Through the annual appropriations for the fiscal year 1937 grants have been made for the period ending June 30, 1937. Funds, therefore, have been made available and most of the plans have been in operation for nine months. After such a gestation period, delivery is indicated.

For the present fiscal year all 48 states, Alaska, the District of Columbia and Hawaii have submitted plans for maternal and child health services. Fifty have been approved and are in operation and in a short time I anticipate the other one will be approved.

The rapidity with which state plans have been submitted and programs developed indicates, I believe, the awareness of the state health de-

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partments of their needs in the field of maternal and child health and their eagerness to satisfy these needs.

Most of you are doubtless familiar with the provisions of the act, compliance with which must be satisfied before approval can be given by the chief of the Children's Bureau and grants made by the Secretary of Labor. However, for the sake of any who are not familiar with them, may I repeat these conditions:

(1) Financial participation by the state.

(2) Administration of the plan or supervision of administration of the plan by the state health agency.

(3) Such methods of administration (other than those relating to selection, tenure of office, and compensation of personnel) as are necessary for the efficient operation of the plan.

(4) Provision for such reports by the state health agency, in such form and containing such information as the Secretary of Labor may from time to time require and for compliance with such provisions as the Secretary of Labor may from time to time find necessary to assure the correctness and verification of such reports.

(5) Provision for extension and improvement of local maternal and child health services.

(6) Provision for cooperation with medical, nursing, and welfare groups and organizations.

(7) Provision for development of demonstration services in needy areas and among groups in special need.

In the langauge of the act, grants to the states for maternal and child health services are made "for the purpose of enabling each state to extend and improve, as far as practicable under the conditions in such state, services for promoting the health of mothers and children, especially in rural areas and in areas suffering from severe economic distress."

I need not present at length to this group the conditions that warrant the extension of these services. Summarized, the situation in the United States is as follows:

"(1) Six women die from diseases of pregnancy and childbirth for every 1,000 infants born alive. This is equivalent to 1 maternal death for every 169 live births (12,859 in 1934).

"(2) Thirty-five babies out of every 1,000 births, or one out of every 29, are born dead (78,503 in 1934).

"(3) Thirty-four out of every 1,000 born alive die before they are one month old, or 1 out of every 29 (73,841 in 1934).

"Such are the dangers to mother and infant at the present time.

"It is well to contrast this state of affairs abruptly with conditions that result 'among women who receive prenatal and maternal care under skilled direction.'*

"(1) Only 2 women died from conditions of childbirth for every 1,000 babies born alive, or about 1 mother for every 418 live births.

"(2) Only 26 babies were stillborn in every 1,000 births.

"(3) Only 29 out of every 1,000 born alive died before they were one month old."

In meeting this situation, let us look at the methods by which the states have undertaken to extend and improve their services in the hope that what has been done in other states may help you in developing services within your state and that, in a similar fashion, what you are doing may be used to aid other states. It seems to me a prime function of the Children's Bureau may well be to serve as a clearing house for these ideas.

Of the total amount of estimated expenditures for the five-month period ending June 30, 1936, nearly 20 per cent was budgeted for the services of physicians, either as full-time administrators or as part-time assistants in health conferences or in postgraduate teaching; 38 per cent was budgeted for public health nursing program; 5 per cent for dental, nutrition and health service; 16 per cent for travel for state and local staff; and 15 per cent for biological supplies, equipment, printing and incidental expenditures. Actually half the cost of the services of physicians in the maternal and child health program and of specialized public health nursing supervisors was charged by the states to Federal funds and an even larger proportion of the expenditures planned for medical, nutrition and health education workers and for instructors in pediatrics and obstetrics is being charged to Federal funds.

What of the actual program and what of the progress made in the extension and improvement of services? The act requires that these services shall be extended to local communities and administered by them. It is not enough to build up a strong state staff. Real services must extend to the periphery, must filter through to the mothers and children they were intended to serve and this can best be done when the local health workers are drawn into the program.

Reports from 47 states tell of programs inaugurated in the first five months. New health services were put in operation in 208 counties, 77 towns and 11 health districts and expansion of service was reported in 167 additional coun-

*Dublin, Louis I; and Corbin, Hazel: A Preliminary Report of a Study of Records of the Maternity Center Association of New York, Jan. 1, 1922-Dec. 31, 1929.

ties, 42 towns and 16 health districts, totaling 521 local communities in which maternal and child health services were extended or improved during the first five months of operation. I submit that for so short a period this is a splendid record of the public health awareness and activity of state and local health agencies.

Specific services extended to these communities include the placing of public health nurses in full-time county health units and in unorganized communities, the organization of maternal, infant and preschool conferences and centers under medical and nursing supervision, maternity nursing service, assistance in tuberculosis and venereal disease control, midwife instruction and supervision, school health examinations, immunization programs, nutrition and dental hygiene services.

To be successful, I believe, any plan for maternal and child health services must comprehend three fundamentals:

(1) It must be a long-range plan.

(2) It must be administered through qualified personnel.

(3) It must secure and hold the cooperation of the medical profession and other health agencies, dental, nursing, welfare.

We of the Children's Bureau have been gratified at the comprehensive viewpoint of the states in their planning, their unwillingness to go too fast, and their solicitude over the question of the permanence of the plan and Government participation.

In the second place, in the great majority of the states there has been an earnest and successful attempt to secure qualified personnel. This has been illustrated by the situation as regards the divisions of maternal and child health in state health departments, since participation by the Federal Government under the social security act. In fact, progress made in the establishment of divisions of maternal and child health and the appointment of qualified physicians to the staffs of these divisions may be used as an initial yardstick in evaluating progress. In June, 1934, there were 31 states with divisions of maternal and child health in the state health departments, but in only 22 of these were the directors on a full-time basis. In the plans already submitted by the 51 states and territories, all have provided for the establishment of bureaus or divisions of maternal and child health as major divisions of the state health department under physicians as directors. In only 2 states has a director not yet been appointed. Of recent appointees since the social security act became operative, the great majority are either pediatricians or obstetricians and, in a number of cases, trained in public health administration.

A similar story might be told in the field of public health nursing. In the expansion of their programs the states have sought out qualified nurses and, where indicated, are giving them additional public health training.

But it is not enough to have a carefully formulated, long-range plan and qualified personnel. May I repeat: to be successful the plan must secure and hold the cooperation of the medical profession and other health agencies.

A practicing physician myself for fourteen years before entering public health work, I have tried to keep this fact constantly in view. More and more, I believe, misunderstanding of objectives and procedure is being removed and the mass of the profession is realizing that interest in and practice of public health measures are as much the obligation of the practicing physician as are his therapeutic and clinical procedures. The relationship of the Federal Government to the states in health matters was recently clarified in a public address, a report of which appeared in the *Journal of the American Medical Association* October 10, 1936.

"The medical profession can rest assured that the Federal administration contemplates no action detrimental to their interests. The action taken in the field of health as shown by the provisions of the splendid social security act recently enacted is clear.

"There are four provisions in the social security act which deal with health; and these provisions received the support of outstanding doctors during the hearings before the Congress. The American Medical Association, the American Public Health Association, and the State and Territorial Health Officers Conference came out in full support of the public health provisions. The American Child Heaith Association and the Child Welfare League endorsed the maternal and child health provisions.

"This in itself assures that the health plans will be carried out in a manner compatible with our traditional social and political institutions. Let me make that point very clear. All states and territories are now cooperating with the public health service. All states except one are cooperating in maternal and child health service, all states but ten in service to crippled children, and all states but nine in child welfare.

"Public support is behind this program. But let me stress, in addition, that the act contains every precaution for insuring the continued support and cooperation of the medical profession.

"In the actual administration of the social security act we count on the cooperation in the future, as hitherto, of the whole of the medical profession throughout the country. The overwhelming majority of the doctors of the nation want medicine kept out of politics. On

occasions in the past, attempts have been made to put medicine into politics. Such attempts have always failed and always will fail.

"Government, state and national, will call upon the doctors of the nation for their advice in the days to come."

The occasion was the dedication of the Jersey City Medical Center and the speaker was President Franklin D. Roosevelt. I think this emphatic statement leaves no doubt as to Federal public health policy.

The degree of participation by local physicians in the plans of the state health department naturally varies in the several states. On the whole, however, there is an increasing tendency to participate as a clearer understanding is gained of what the plan implies. Recently I visited a county in a neighboring state where of 17 practicing physicians in a community, 14 are participating to the extent of two mornings a week. I may say in passing that the full-time health officer of this county is an alert, enthusiastic public health worker and cooperation with him would be as easy as floating along with a stream, except, of course, for the occasional stones and roots which were not meant to float.

A valuable and thus far highly appreciated service to local physicians is provided through institutes and postgraduate courses to keep the physicians in touch with the latest medical developments in obstetrics and pediatrics. Already 30 states have budgeted funds to be used for postgraduate education and of these 30, 15 have held courses. It is probable that 40 will have such a program carried out during the fiscal year 1937.

In a state where postgraduate courses were held for the physicians the state health officer sent a questionnaire to those who had attended the course. Of those replying (1) 96 per cent answered that they found the course valuable; (2) 27 per cent reported that adequate time had been given for discussion; (3) 72 per cent felt that the charging of a small fee to physicians attending would be advisable.

As physicians and public health workers I am sure we approved the steps taken by the states through grants under the social security act to render services in the field of dental and mouth hygiene. A Western state has recently added to the staff of its child hygiene division a director of dental hygiene, who is secretary of the state dental association and editor of its journal. Recently I had the opportunity to hear this man outline his objectives. He not only comprehends the importance of dental hygiene from the viewpoint of digestion, nutrition, and the control of infection through the important portal of the mouth, but he also stresses its importance from another viewpoint which we physicians have too often overlooked, namely: the psychological. If the avowed objective of education is the preparation of children for successful living, certainly one of the factors in this success is personal appearance. The shape of the face, the condition of the teeth, and the condition of one's health have an important bearing on this personal appearance. Crooked teeth, decayed teeth, unclean teeth, missing teeth, malformed jaws are handicaps to overcome or avoid in the struggle for personal success. Dental health education not only will result in the general well-being of children, but will eventually result in a healthier, happier, and more successful adult population.

There is one final point I should like to stress and that is the education of the public as to the content and objectives of public health measures. It is obvious that public acceptance is the essence of future cooperation and the extension of services. I should, therefore, like to ask this question of you, members of the Southern Medical Association: how aware are the people of your community of the services you have to render and what educational measures have been adopted to keep them informed?

What are mothers and children of your state actually getting in the way of improved services?

Where are the services now available?

What parts of the state are not yet reached and how may they be reached?

How much service is available in areas embraced under your state plan?

What is a complete county or local maternal and child health service?

How is your state progressing toward the goal of a well-rounded maternal and child health service extended to all areas in the state and how is this program being correlated with the general local health program?

Some of these are hard questions, but on your willingness to ask the questions and through cooperation attempt the answers, depends the effectiveness of your state's program for maternal and child health services.

To summarize:

With the beginning of the fiscal year July, 1937, the states start on their first full year of operation of plans for maternal and child health services in cooperation with the Children's Bureau through grants in aid under the social security act. Staffs, including pediatricians, ob-

stetricians, public health nurses, nutritionists, dentists, and health educators have been assembled and the plans are in operation. General and local advisory committees have been appointed to assist state and local staff in rendering the services to the mothers and children of the several states. Any present evaluation of results of operation of these plans would be premature. We do feel, however, that the spirit of cooperation shown by the state, their eagerness to find and appoint qualified personnel, and the response of professional and lay groups justify our belief in the lasting value of the services to be rendered to mothers and children.

MOLDS IN THE ETIOLOGY OF ASTHMA AND HAY FEVER WITH SPECIAL REFERENCE TO THE COASTAL AREAS OF TEXAS*

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Houston, Texas
and
MARIE BETZNER MORROW, PH.D.
Austin, Texas

Damp climates have been so uniformly associated with a high incidence of respiratory allergic disease that special attention has been directed to an explanation of the cause. Storm Van Leeuwen[1] rightfully deserves credit as the first investigator to suspect that fungi might be the "climatic allergens" at fault. His work was done in Holland where the incidence of molds in the soil of marshy districts and even in mattresses and other articles of the patients' homes was unduly high. Subsequent work in Germany, by Hansen,[2] and in this country by Hopkins, Benham and Kesten,[3] Bernton and Thom,[4 5] Flood,[6] Cobe,[7] and Towey,[8] has further substantiated the fact that air-borne fungi may act as specific excitants of asthma and hay fever in the same way that pollens and other more familiar substances have long been known to do. More recently Brown[9] has shown by painstaking cultural methods that molds and yeasts may be the specific constituents in house dusts, mattresses, furniture and other environmental factors, especially in damp localities.

In 1933, it occurred to us that perhaps molds might be responsible for certain baffling cases of asthma and hay fever in Galveston and the neighboring coastal areas. These patients have most of their trouble from November until April, during which period there is no definite pollen season to account for symptoms. Remissions are usually experienced when the wind is from the Gulf, and exacerbations are noted during north and northeast winds. This relationship is readily explained on the basis of the mold content of the air, when it is remembered that the city occupies the full width of Galveston Island, and that consequently there is no intervening swampy district on the Gulf side (*Fig. 1*). On the contrary, the mainland to the north and northeast is more or less swampy for a distance of fifty miles. These marshes are covered by a variable amount of brackish water during high tides, but we have made the interesting observation that strong north winds cause such a lowering of the tide that thousands of acres of swampland are exposed, thereby allowing an excellent opportunity for the mold flora of the saline vegetation to become dried and to be more thoroughly disseminated by the wind. The eastern extremity of the island itself is likewise marshy, and doubtless adds more molds to northeast and east winds. On the other hand, marshy areas on the western portion of Galveston Island and on the adjacent western mainland are not important to inhabitants of the city for the reason that a

Fig. 1
Map of Galveston and vicinity, showing the marshy areas to the north and northeast.

*Read in Allergy Clinic and Round Table, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Department of Practice of Medicine, University of Texas School of Medicine, and the Medical Service of the John Sealy Hospital, Galveston, Texas, and the Department of Botany and Bacteriology, University of Texas, Austin, Texas.

minimum of wind is experienced from this direction during the winter.

At the time of publication of our preliminary report[10] we considered any north or northeast wind to be heavily laden with mold spores, but subsequent daily exposures of mold plates have definitely established the fact that on damp or rainy days the mold content of the air is materially lower than on dry days of the same wind direction, as will be shown later. However, this is to be expected because wet molds can be no more easily disseminated by the wind than can wet pollen.

Collection of Material.—In order more thoroughly to study variations in the mold content of the air and to secure molds representative of our locality, we began a series of outside plate exposures in June, 1933. Sterile plates of Sabouraud's agar were exposed from the roof of a two-story building for periods of five minutes each and allowed to incubate at room temperature until growth appeared, usually four to seven days. To our surprise, the number of colonies on several of these plates was so great that mutual contamination could not be avoided; consequently, the time of exposure was reduced to two minutes. At the same time several plates were exposed for equal periods of time indoors. Colonies which appeared macroscopically to be different were selected for transplanting into Sabouraud's agar tubes for more careful study and identification. In this manner twenty-seven cultures of air-borne fungi were secured. These were extracted for testing and for therapeutic procedures as outlined below, and formed the basis for the preliminary study of six mold-sensitive patients.[10] However, these exposures were not conducted over a long enough period of time to allow conclusions based upon seasonal variations.

The criticism was advanced that perhaps plates exposed from such a low altitude did not represent the true amount of mold brought in by the wind, inasmuch as contamination from the street level and from the roofs of adjacent houses could not be excluded.[11] To minimize this source of error, subsequent exposures were conducted from the ninth floor of an isolated office building, the plates being held outside an open window with the agar surfaces in the direct face of the wind. This series of exposures was begun in September, 1934, and was continued through June, 1935; at the same time a series of daily indoor exposures was made in the home of an asthmatic patient sensitive to molds.

The results of these daily exposures are shown in *Fig. 2.* The number of days of south wind and the number of dry and damp days with north winds are shown in *A, Fig. 2.* In *B* is shown the predominance of colonies on dry days over those of rainy or damp days when the wind was from the north. *C shows* the average daily count for all north winds to be greater than that secured from south winds. In *D* it is seen that the curve obtained by plotting the average daily number of indoor colonies per month is practically parallel to the curve for outdoor colonies, except in the spring months when the in-

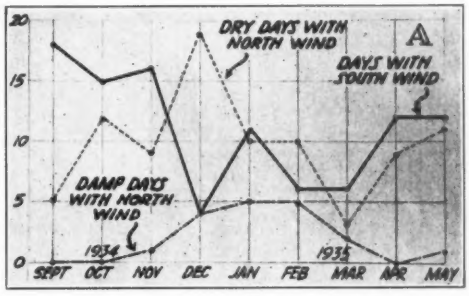

Fig. 2A
(See Fig. 2D)

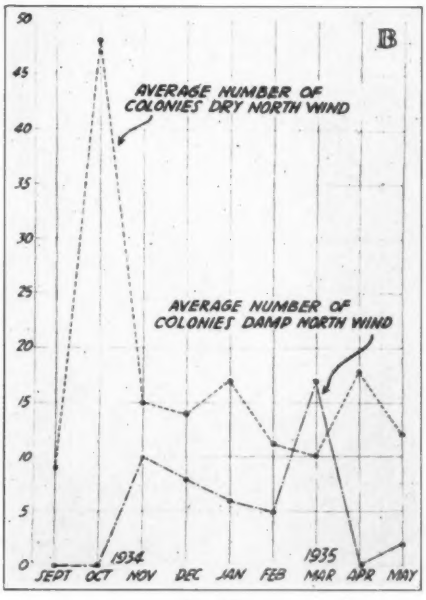

Fig. 2B
(See Fig. 2D)

door colonies somewhat exceed those from the outside air.

Fig. 3 shows a similar series of outside exposures from February 1, 1936, to September 1, 1936. The increasing number of days with south winds in the late spring and summer as shown in *Fig. 3A*, may have some bearing on lowering the

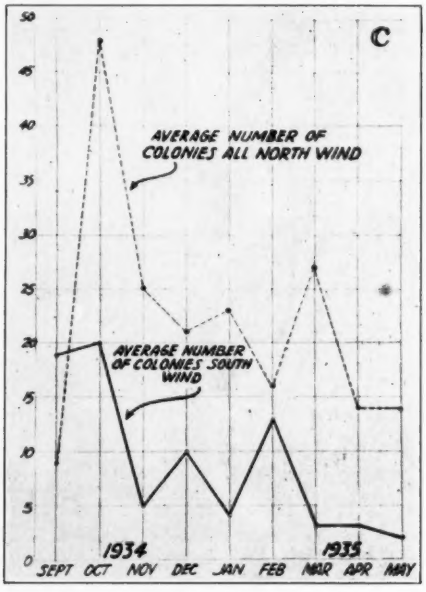
C
AVERAGE NUMBER OF COLONIES ALL NORTH WIND
AVERAGE NUMBER OF COLONIES SOUTH WIND
1934
1935
SEPT OCT NOV DEC JAN FEB MAR APR MAY

Fig. 2C
(See Fig. 2D)

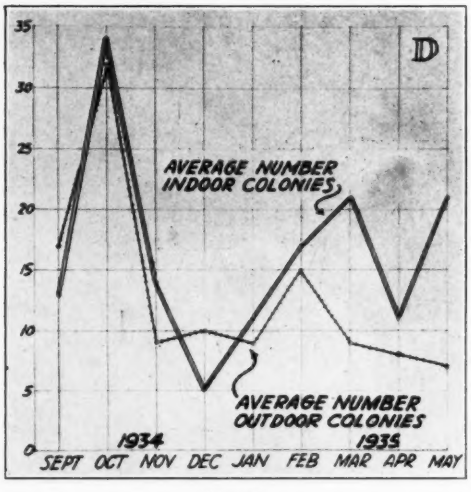

Fig. 2D

A. B. C and D. Data collected from September 1, 1934, to May 31, 1935. All plates exposed two minutes; counts reduced to average number colonies per plate per month.

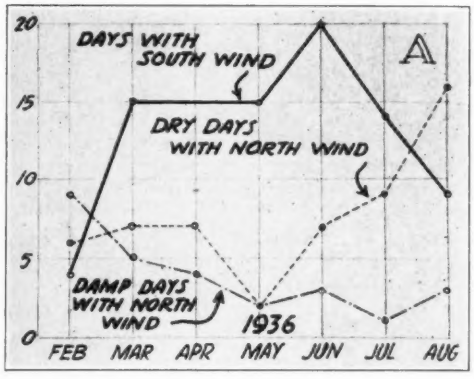

Fig. 3A
(See Fig. 3C)

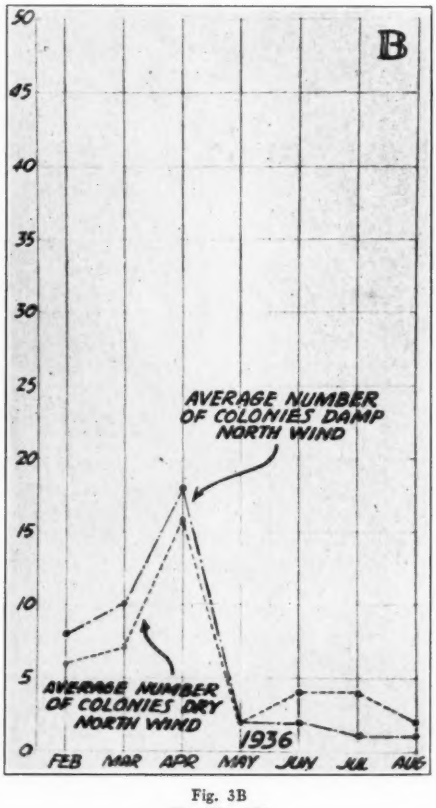

Fig. 3B
(See Fig. 3C)

total mold concentration during these months. However, the expected increase in plate counts on dry days over those for damp days was not found in this series (*Fig. 3B*), although the total north wind counts exceeded those of south winds (*Fig. 3C*). Indoor exposures were omitted from this series after no material difference had been found in the number of indoor and outdoor colonies.

Since *Figs. 2 and 3* represent only average daily counts for each month, they do not disclose immediate fluctuations in the amount of air-borne fungi that may occur in a shorter period of time as represented by several successive days. *Fig. 4* shows a series of plates exposed in January, 1935. On January 19, six colonies of molds were recovered from a dry southeast wind; on January 21, during a north wind accompanied by rain and sleet, fifteen colonies were obtained, while on January 22, after the norther had become dry and colder, 128 colonies were grown. Another series, collected in March, 1936, is represented in *Fig. 5*. The exposure of March 13, in a slightly damp east wind, revealed one colony; a dry south wind on March 15 gave one colony, while a damp southwest wind on the morning of March 16 contained no molds. About noon, however, a "dust storm" blew up, accompanied by a strong north wind; an exposure in the afternoon resulted in thirty-six colonies.

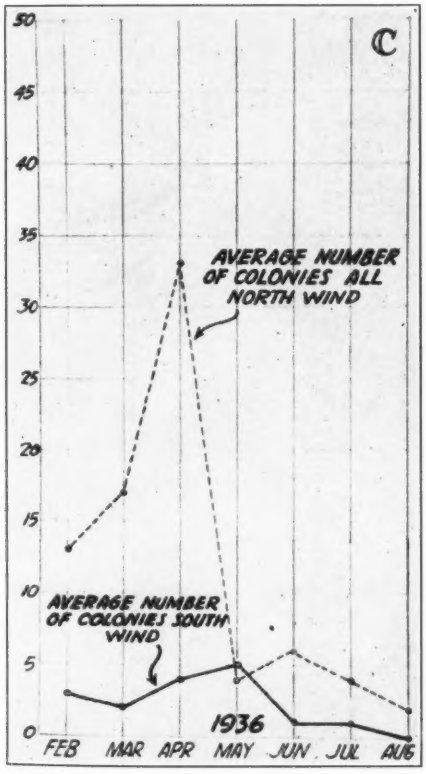

Fig. 3C

A, B and C. Note the increased number of days with south wind in spring and summer. Plate counts as in Fig. 2.

The following comparison with pollen concentration is inserted at this point to afford a better appreciation of the significance of such high plate counts. In counting pollen, one takes the number of grains observed in traversing a 2.5 cm. slide five times with the low power (16 mm.) objective, the field therefore being 0.15 cm. wide, making a total area of 1.875 sq. cm.; this method gives the number of pollen grains per cubic yard of air for twenty-four hours. For molds in the air, we expose a 10 cm. culture plate, with an area of 63.62 sq. cm., for two minutes (1/720 day). To transpose the number of molds in the air as represented by the colonies obtained in a two-minute exposure, into terms comparable with those employed in counting particles by the twenty-four hour slide method, the following method could be used:

$$\frac{1.875}{63.62} \times \frac{720}{1} \times \text{number of colonies, which on}$$

reduction, becomes 21 $\times$ the number of colonies. From this it is seen that the 128 colonies obtained in two minutes, on January 22, would be 128 $\times$ 21, or 2,688 spores, etc., per cubic yard of air for twenty-four hours! This does not take into consideration devitalized fungus material, which is potent allergenically, but only that capable of growing on culture media.

From the exposures cited above as many of the grossly different colonies were selected for study as our facilities would permit, but the enormous task connected with any survey of fungus growth far exceeds our limitations. However, we have been able to secure and identify about ninety cultures of fungi. While some of these have proven to be duplicates, the list includes a large number of aspergilli, with aspergillus fumigatus and aspergillus niger predominating; a number of moniliae, which have been secured in both indoor and outdoor cultures; and a few strains of penicillium. Helminthosporium,

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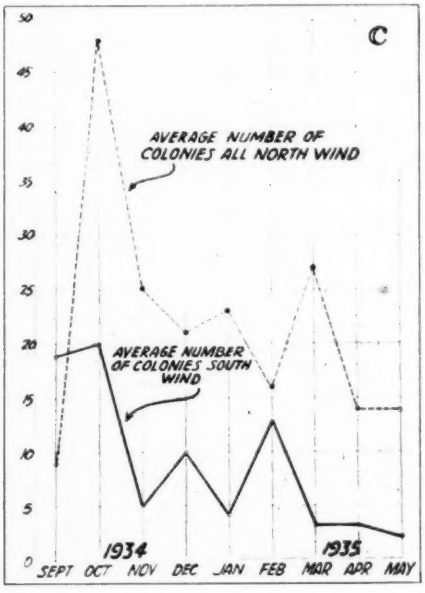
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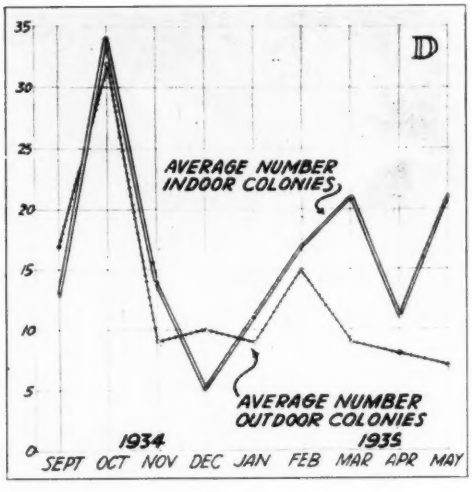

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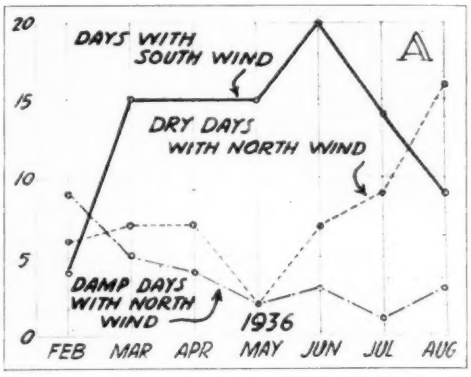
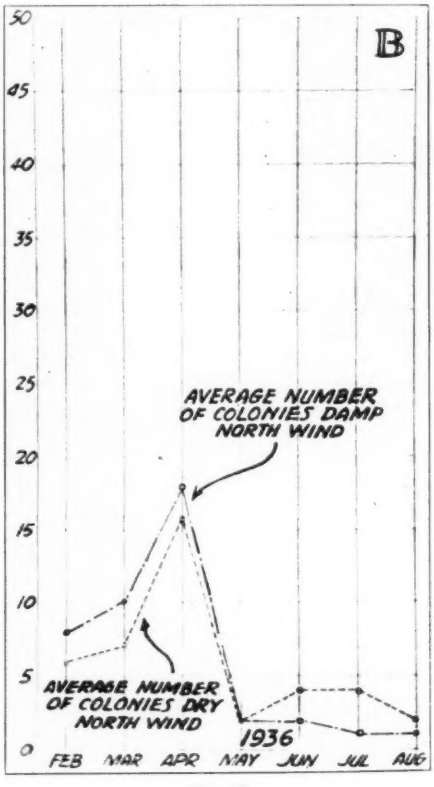


Fig. 3A
(See Fig. 3C)



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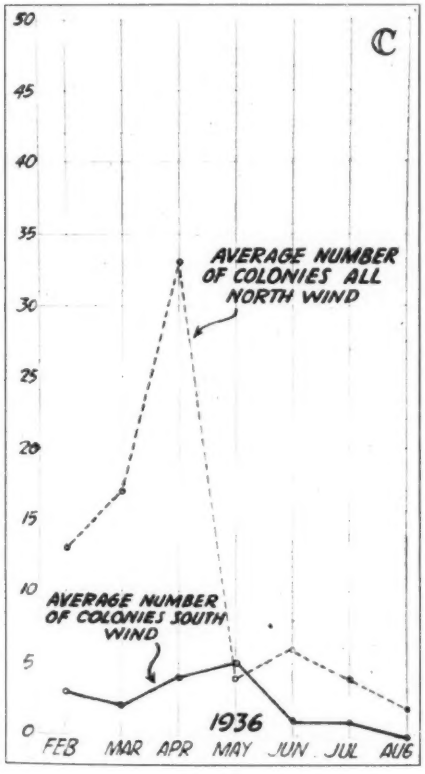

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cephalosporium, and spondylocladium have been found rarely. Strangely enough, alternaria, which has gained prominence in other reports, has not been found in our identified series.

Preparation of Extracts.—In order to secure a sufficient quantity of each mold for extraction, the isolated cultures were transplanted into sterile Sabouraud's broth contained in liter flasks, and allowed to incubate at room temperature. In most instances a generous "felt" was obtained on the surface of the broth within ten days, but the flasks were not disturbed for several days and

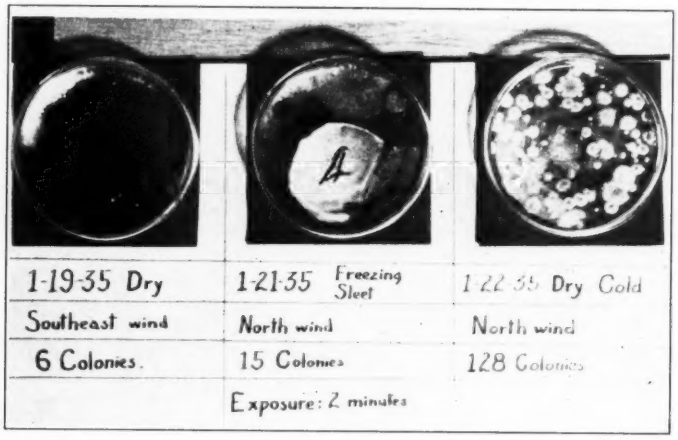

Fig. 4
Increase in plate counts with dry north wind.

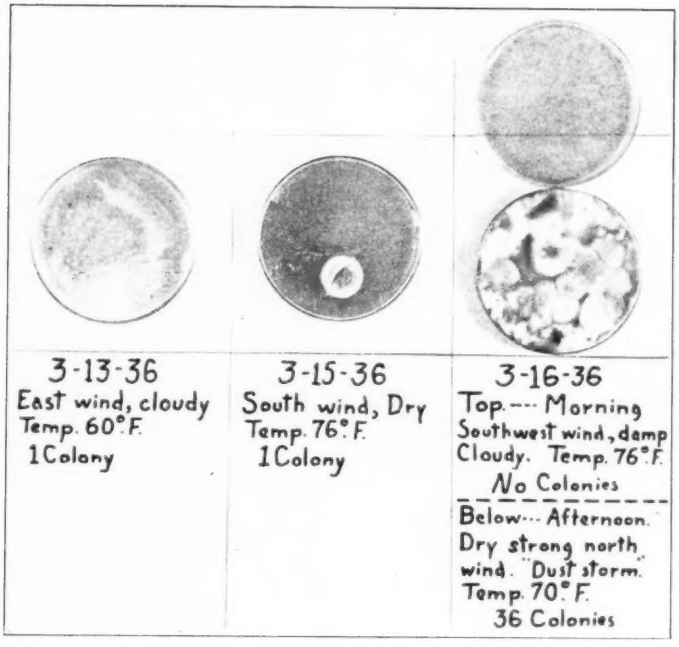

Fig. 5
Showing increased number of colonies with dry north wind.

then only after close observation disclosed that growth and spore formation, as revealed by color production, had reached the maximum. The "felts" with whatever spores had formed were then carefully removed, placed on filter paper in large glass funnels and washed thoroughly with water to remove the culture media. The edges of the filter paper were then turned up over the

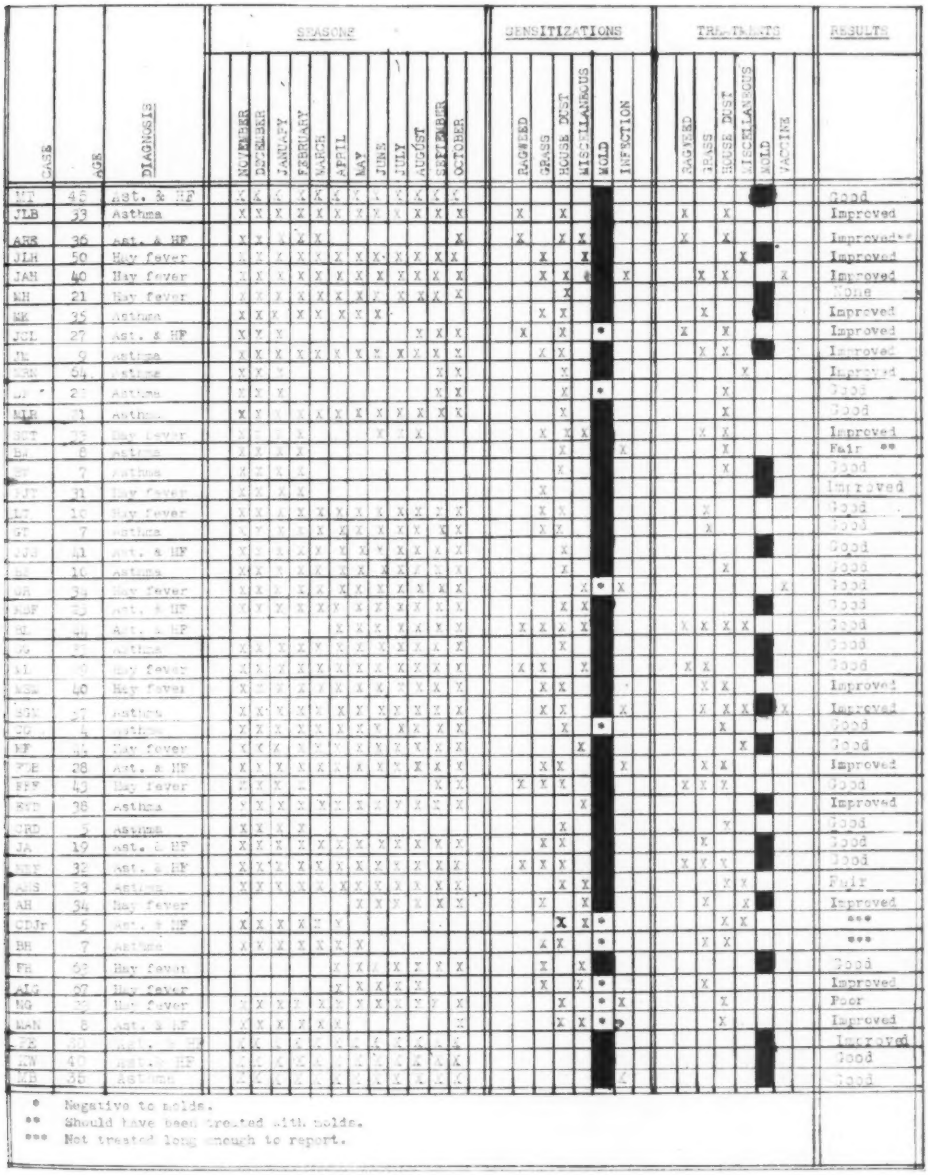

Table 1
SHOWING RESULTS OF THERAPY OF FORTY-SIX CASES OF RESPIRATORY ALLERGY TESTED WITH MOLDS

cephalosporium, and spondylocladium have been found rarely. Strangely enough, alternaria, which has gained prominence in other reports, has not been found in our identified series.

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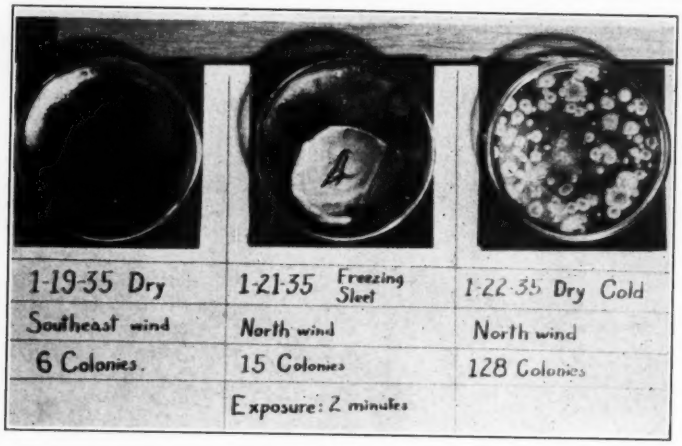

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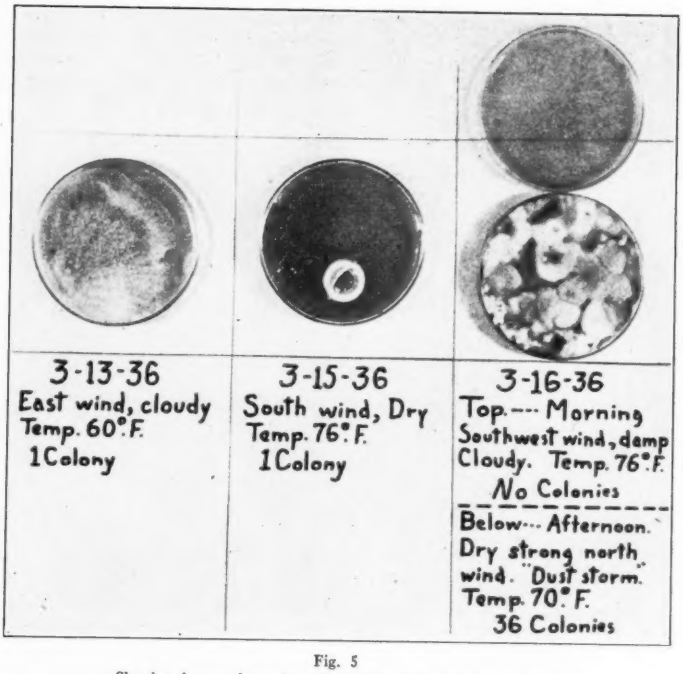
Increase in plate counts with dry north wind.



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CASE	AGE	DIAGNOSIS	SEASONS: NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	SENSITIZATIONS: RAGWEED	GRASS	HOUSE DUST	MISCELLANEOUS	MOLD	INFECTION	TREATMENTS: RAGWEED	GRASS	HOUSE DUST	MISCELLANEOUS	MOLD	VACCINE	RESULTS
MT	45	Ast. & HF	X	X	X	X	X	X	X	X	X	X	X	X													Good
JLB	33	Asthma	X	X	X	X	X	X	X	X	X	X	X	X	X		X				X		X				Improved
AHB	36	Ast. & HF	X	X	X	X	X							X	X		X	X			X		X				Improved**
JLH	50	Hay fever	X	X	X	X	X	X	X	X	X	X	X	X		X		X						X			Improved
JAH	40	Hay fever	X	X	X	X	X	X	X	X	X	X	X	X		X	X		•	X		X	X		X		Improved
MH	21	Hay fever	X	X	X	X	X	X	X	X	X	X	X	X			X										None
MK	35	Asthma	X	X	X	X	X	X	X	X						X	X					X					Improved
JCL	27	Ast. & HF	X	X	X							X	X	X	X		X		•		X		X				Improved
JM	9	Asthma	X	X	X	X	X	X	X	X	X	X	X	X		X	X					X	X				Improved
MRN	64	Asthma	X	X	X								X	X			X							X			Improved
HP	22	Asthma	X	X	X								X	X			X		•				X				Good
MLR	21	Asthma	X	X	X	X	X	X	X	X	X	X	X	X			X						X				Good
SCT	23	Hay fever	X	X	X	X				X	X	X				X	X	X				X	X				Improved
BW	8	Asthma	X	X	X	X											X			X			X				Fair **
BW	7	Asthma	X	X	X	X											X						X				Good
FJT	31	Hay fever	X	X	X	X										X											Improved
LT	10	Hay fever	X	X	X	X	X	X	X	X	X	X	X	X		X	X					X					Good
GT	7	Asthma	X	X	X	X	X	X	X	X	X	X	X	X		X	X					X					Good
JJS	41	Ast. & HF	X	X	X	X	X	X	X	X	X	X	X	X			X										Good
BS	10	Asthma	X	X	X	X	X	X	X	X	X	X	X	X			X						X				Good
GR	34	Hay fever	X	X	X	X	X	X	X	X	X	X	X	X				X	•	X						X	Good
MBF	25	Ast. & HF	X	X	X	X	X	X	X	X	X	X	X	X			X	X									Good
BL	44	Ast. & HF						X	X	X	X	X	X	X	X	X	X	X			X	X	X	X			Good
JG	32	Asthma	X	X	X	X	X	X	X	X	X	X	X	X			X										Good
ML	29	Hay fever	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			X	X					Good
MSH	40	Hay fever	X	X	X	X	X	X	X	X	X	X	X	X		X	X					X	X				Improved
SGH	57	Asthma	X	X	X	X	X	X	X	X	X	X	X	X		X	X			X		X	X	X		X	Improved
CG	4	Asthma	X	X	X	X	X	X	X	X	X	X	X	X					•					X			Good
MF	44	Hay fever	X	X	X	X	X	X	X	X	X	X	X	X					X						X		Good
WDB	28	Ast. & HF	X	X	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X			Improved
FEF	43	Hay fever	X	X	X	X							X	X	X	X	X				X	X	X				Good
EWD	38	Asthma	X	X	X	X	X	X	X	X	X	X	X	X				X									Improved
CRD	5	Asthma	X	X	X	X											X						X				Good
JA	19	Ast. & HF	X	X	X	X	X	X	X	X	X	X	X	X			X	X					X				Good
MEF	32	Ast. & HF	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X				Good
AHS	29	Asthma	X	X	X	X	X	X	X	X	X	X	X	X			X	X						X	X		Fair
AH	34	Hay fever							X	X	X	X	X	X		X		X					X		X		Improved
CDJr	5	Ast. & HF	X	X	X	X	X	X									X	X	•					X	X		***
BH	7	Asthma	X	X	X	X	X	X	X							X	X		•				X	X			***
FH	62	Hay fever						X	X	X	X	X	X	X		X		X									Good
ALG	67	Hay fever					X	X	X	X	X					X		X	•				X				Improved
MG	23	Hay fever	X	X	X	X	X	X	X	X	X	X	X	X			X		•	X				X			Poor
MAN	8	Ast. & HF	X	X	X	X	X	X						X			X	X	•					X			Improved
PE	30	Ast. & HF	X	X	X	X	X	X	X	X	X	X	X	X													Improved
KW	40	Ast. & HF	X	X	X	X	X	X	X	X	X	X	X	X													Good
WB	35	Asthma	X	X	X	X	X	X	X	X	X	X	X	X						X							Good

* Negative to molds.
** Should have been treated with molds.
*** Not treated long enough to report.

Table 1
SHOWING RESULTS OF THERAPY OF FORTY-SIX CASES OF RESPIRATORY ALLERGY TESTED WITH MOLDS

fungus material and secured with rubber bands to form closed sacks, thus preventing loss of spores. After remaining in the funnels for a day or two for preliminary drying, the molds were placed in individual desiccators over calcium chloride. Weighed amounts of the dried material were ground in a mortar and thoroughly mixed with the extraction fluid, which consisted of one-third buffered saline and two-thirds glycerine, in the proportion of one gram of mold to 40 c. c. of fluid (2.5 per cent). After about two days the extracts were sterilized by Seitz filtration.

Dilutions for testing were prepared with buffered saline in two concentrations, 1:2,000 and 1:500. Testing soon revealed the weaker dilution to be inadequate, and the stronger strength in no instance provoked alarming reactions; the 1:2,000 dilutions were therefore abandoned. All testing was done by the intracutaneous method in the usual manner. In every instance many of the tests failed to react, and these sites were considered as negative from the standpoint of controls.

CASE REPORTS

Table 1 shows the results of forty-six cases of respiratory allergic disease seen from 1933 to 1936. The only criterion used in the selection of these cases was that the complaints for which relief was sought were actually manifestations of allergy; where infections had become superimposed sufficiently to alter the disease the fact is so indicated. Although all the cases presented were tested, only thirty-seven gave definitely positive reactions to one or more molds. Of these thirty-seven giving positive reactions, only twenty-one were subjected to therapeutic injections of mold extract, the remaining sixteen having been treated with other substances to which reactions had been obtained. This policy is in keeping with our efforts not to over-emphasize the importance of molds, nor to seek an explanation of symptoms on the basis of fungus sensitization where other offenders are clearly at fault. At the same time we feel that poor results in certain instances, as indicated in the table, might have been improved upon had mold therapy been instituted. Of the twenty-one patients treated with molds, twelve achieved good results, eight experienced sufficient improvement to justify the continuation of their treatments, while one received no improvement. Of the sixteen patients sensitive to molds but treated with other substances, seven were relieved, seven were improved, and two were only slightly benefited. *Table 2* shows a summary of the results obtained by the patients who showed positive reactions to molds.

Table 2

Tested with molds	46
Negative to molds	9
Positive to molds	37
Treated with molds	21
Improved	8
Good results	12
No improvement	1
Treated with substances other than molds	16
Improved	7
Poor results	2
Good results	7

An analysis of the most commonly encountered mold reactions is found in *Table 3.*

Table 3

Monilia sitophila	17
Monilia geophila	13
Penicillium	15
Aspergillus niger group	22
Aspergillus sydowi	2
Aspergillus japonicus	2
Trichoderma	3
Helminthosporium	5
Hormodendrum	2
Cladosporium	1
Alternaria*	4
Unclassified	7

*Alternaria not recovered locally.

While most reactions have been encountered to the aspergilli it is to be remembered that this group of molds is a very extensive one and embodies several sub-groups which cannot be assumed to contain a common antigen, without further confirmation. These molds may be encountered both indoors and in the outside air. The moniliae, on the other hand, have impressed us with the possibility that they might contain something comparable to a common antigen because reactions to one of them have usually been associated with sensitization to the other. Also, the moniliae have seemed to cause more severe reactions, both local and systemic. We have encountered *Monilia sitophila* very commonly on

indoor cultures, and often as a serious laboratory contamination; *Monilia geophila* has been encountered on several occasions in the outside air, but not on indoor exposures. As a result of the apparent ubiquity of monilia and of its seeming toxicity, this extract has been included in treatment more than any other fungus extract in our series. Several patients have shown marked reactions to unidentified molds and have been relieved by the administration of the appropriate extracts; this practice may not be ideal from an academic viewpoint, but in many instances it has simplified the difficulties of therapy.

In the selection of extracts for treatment of any given case, attention has been paid to those showing the strongest reactions, and only those of unrelated species have been included in polyvalent mixtures; no more than three and often only one or two molds have been given. The strength of the initial therapeutic extract has always been one-tenth of the testing strength; if marked local or systemic reactions resulted, the next injection was still further reduced by a 1:10 dilution. It has been found that the increase in dosage could not be attained as rapidly as in the case of most inhalant allergens, because of the tendency to delayed local reactions; similarly, an increase in the time interval between injections has usually been required.

All mold sensitive patients have not only been given specific treatment with fungus extracts, as outlined above, but they also have been instructed in the usual dust-proofing measures.

DISCUSSION

The foregoing studies have brought to light several important facts. In the first place, mold sensitizations in the coastal region of Texas are more likely to be manifest in the winter months. Again, an increase in the mold content of the air is actually encountered in the winter, when the moisture is conducive to the growth of fungi and when the temperature and amount of ultraviolet light are not extremely unfavorable. In sharp contrast is the increased incidence of mold cases in the Great Lakes area in the summer, with an absence of heavy mold concentration there in the winter as a result of the extreme cold.[12 13] However, the fungi in our region must not be overlooked as a possible cause of trouble at any season (*Table 1*), and we believe that in this respect they equal or even exceed the ever-present house-dust allergen.

CONCLUSIONS

(1) Molds are unduly prevalent in certain coastal regions of Texas.

(2) North winds, coming from the swampy interior, bring high mold concentrations to the immediate coast.

(3) Patients living in damp or marshy districts should be tested and treated with appropriate fungus extracts.

(4) Therapy with mold extracts is distinctly encouraging.

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DISCUSSION (*Abstract*)

Dr. Grafton Tyler Brown, Washington, D. C.—It is evident from this and other similar contributions to the literature, that there is a rapidly growing appreciation of the importance of molds in the etiology of asthma and other allergic diseases.

A rather original method is described in this article for estimating the approximate number of mold spores in the air, and the figure of 2,688 spores per cubic yard is certainly high. It is not surprising that such a high percentage of asthma and hay-fever patients in that vicinity is found sensitive to molds.

It is an interesting observation that Dr. Prince and his co-worker did not find Alternaria on any of their numerous mold plates and obtained only four positive reactions to this particular fungus; whereas most of us who have worked with molds in other parts of the United States have found Alternaria to be of primary importance. It has been my experience, as well as that of other investigators, that molds are most prevalent during the summer months, but Dr. Prince has just shown us that on the coast of Texas the highest mold counts are recorded during the winter months, due to north winds from marshy land. It would seem from this report that molds are unusually prevalent in the coastal regions of Texas, and hence have a greater relative importance there than they have in most other localities.

The importance of molds in allergy can be appreciated if we stop to consider the following facts: molds are ubiquitous, and are found both indoors and out; mold spores are readily air-borne, as they are smaller than pollen grains, so much smaller in fact that they are usually completely overlooked on ordinary pollen slides; patients can be shown to be definitely sensitive to molds by positive skin tests, both scratch and intradermal, by passive transfer, by reproduction of asthmatic symptoms on inhalation of mold spores, and finally by the gratifying results to be obtained from desensitizing injections with specific mold extracts.

Dr. Charles Thom, Washington, D. C.—Such surveys as Dr. Prince has conducted have given us clues as to the size of the spore-load in the air to be filtered out by the mucous membrane in the nose and pharnyx. Conducted as they have been in different sections of the country, we get some idea of the differing load due to climatic and agricultural differences. The airplane surveys by Meyer give some idea of the long distance traveled by some spores in the upper air. With some exceptions, there is so much similarity in the results of these various types of survey that we need careful study of particular species, groups and their significance, rather than more and broader surveys. The completeness with which the mucous membrane of the nose and pharynx filter out these organisms arouses particular interest in the number of a particular excitant which must be taken from the air to initiate symptoms in the susceptible individual. On this point we have little information thus far.

Dr. Prince (*closing*).—Since assembling the data as presented above, we have noticed the sharp increase in the incidence of air-borne molds during the ragweed season. This presents a problem in differentiating mold and ragweed sensitization, especially since ragweed pollen is brought into Galveston during the ragweed season by the same north wind that brings in the molds. We feel that an appreciation of this fact will enable us to improve our results in the treatment of a few ragweed patients not previously adequately relieved.

One point regarding our selection of cases should be further emphasized. We have not tested with molds our strictly seasonal cases nor others with obvious etiology, but have employed molds for testing only in the more difficult cases. The forty-six cases tested were drawn from approximately two hundred patients with respiratory allergic diseases. The twenty-one patients selected for therapy with molds would indicate that we considered molds primarily important in about 10 per cent of our patients. This is somewhat higher than the incidence given by other investigators.

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
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VITAMIN A DEFICIENCY AND VISION

Human vitamin deficiency studies are quite difficult to make and to control, though workers in various laboratories have investigated mild A deficiency in children, using night blindness as a test.[1]

A form of night blindness due to dietary deficiency of vitamin A and rapidly remediable by supplying this accessory food is reported to be common in children. Danish workers[2] have very painstakingly striven to evolve an accurate quantitative test for the condition in babies. By the method for which they have devised standards, they say that they can demonstrate the potency or ineffectiveness of A preparations in common use, the deficiencies of certain popular pediatric diets, and the different responses of human infants in health and disease to such materials as codliver oils, halibut oil, carotene, dried spinach and other A concentrates. The test is referred to as a psychological test, since it is to some extent subjective. However, it is capable of objective interpretation and has given constant results during many repetitions. The technic is tedious and requires infinite patience and accuracy.

The infant is kept quietly in a dark room for ten minutes until its eyes are adjusted to absolute darkness. A standard source of light is provided, and photometric glasses of graduated capacity for absorption of light are placed before the light source to reduce its brightness to measured intensities. The strongest glass is used first to test the infant's perception of a very weak light which goes through it. If no signs of vision or irritation are produced, a glass which absorbs less light, thus allows more light to pass through, is employed, so that the infant may receive a slightly stronger stimulation. If this produces no reaction, a weaker lens, thus stronger light, is used, and so on. The light-absorbing capacity of the glasses is known and their number is used to denote the reaction, or degree of night blindness. The weakest test light is flashed repeatedly on the infant's face, subsequently if need be, a stronger, until signs of reaction as wrinkling of the eyelids, facial movements, or reaching at the light appear. The faintest light which induces reflex movements of the child is called the "minimum reflexible," which is expressed in terms of the glass used to control the strength of the light. It is quite an ingenious method.

By this technic, the normal "minimum reflexible" was set at six for infants which have received adequate vitamin A. Great increase of dietary vitamin did not raise the power of light reaction above this point. Dietary shortage of A rapidly reduced it to four or five. In the absence of vitamin A a stronger light was required to stimulate the infant visual sense. Herbivorous animals store considerable amounts of vitamin A in the liver. In infants the supply is readily exhausted. Infants which had been kept on a water diet for forty-eight hours, or for a short period on the fat-free diet which is a popular treatment for diarrheas and intestinal upsets, showed signs of A deficiency. The infant storage of this accessory food factor is slight.

An infant with a low "minimum reflexible,"

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2. Friderichsen, C.; and Edmund, C.: Studies of Hypovitaminosis A: A New Method for Testing the Resorption of Vitamin A from Medicaments. Amer. Jour. Dis. Child., **53**:89 (Jan.) 1937.

3. Ibid: Clinical Experiments in the Vitamin A Balance in Children After Various Diets. Ibid, p. 1180 (May) 1937.

given a dose of a potent A preparation, showed a practically immediate response of visual sense. Within thirty minutes or less after oral ingestion of A a low response could be restored to normal. This seems a remarkably rapid reaction to oral medication. During diarrhea or infection, a much larger dose of vitamin was needed to restore the threshold of light perception to normal, a warning that the sick infant is not able to make as efficient use of its food supply as the well, and that extra precautions should be used to insure adequate vitamins during disease, particularly since the infant storage or reserve is slight. Various sources of A were compared as to their effects on infant light reflexes. Carotene was a less effective source of A than dried spinach, and dried spinach was much more potent than the fish oil concentrates and more lasting. A single dose of halibut oil or codliver oil exerted its full effect for three to six days, after which the supply was gradually exhausted, while the effect of a single dose of dried spinach was traced for ten days to two weeks. Five hundred sixty international units of A as halibut oil were less effective than fifty units as dried spinach.[3] Spinach was thus ten times as effective, over a much longer period, than other A sources, a finding which may strengthen the following of "Popeye" of the comics.

These relations of A sources, of course, have not proven true in tests on laboratory animals which have furnished the international standards. One is therefore inclined to conclude that vitamin A is not the only food factor which was inadequate in the infants studied; and that the reaction to light in infants is controlled by several dietary elements rather than entirely by the vitamin A intake. Infants of course are more complicated in their make-up than rats and cannot be maintained on the same simplified synthetic ration as experimental animals. The information gained by Friderichsen and Edmund is exceedingly interesting and of therapeutic significance, though its dietary implications may not be simple.

From a diagnostic viewpoint, it is unlikely that a sick infant brought to medical care is suffering from insufficiency of a single food element. The concentrated purified vitamin products now available are chemical wonders and curiosities. In pediatric prescriptions, they may have received an attention greatly in excess of their clinical value.

GLEANINGS FROM RECENT JOURNALS

Hastening the Clotting of Hemophilic Blood.—Hemophilia continues to be a distressing disease of keen interest to pathologists. So much is known of the clotting of the blood outside the body that *in vivo* failure to clot ought not to be the mystery which it has remained. A recent substance studied as a blood coagulator is trypsin.[1] It hastens the clotting of both normal and hemophilic blood in the test tube. It causes rapid coagulation of oxalated normal or hemophilic blood. Oxalate is usually added to blood withdrawn from the body to precipitate calcium and prevent clotting.

Trypsin given orally to hemophilics did not reduce their clotting time. Given intravenously to rabbits it caused instant death with thrombus formation. It might presumably in sufficiently small intravenous dosage stop the bleeding of hemophilia if one could find a physician who wanted to give it, and he could direct the thrombus to the proper place. Possibly external application at the site of bleeding might offer a less rapidly fatal method.

Patek and Taylor,[2] of Boston, have reported the concentration of a globulin-like substance of normal blood which on intravenous injection accelerates the clotting of hemophilic blood. It was without untoward effects and the reduction of clotting time lasted about ten hours. The material is destroyed by heat.

Nitrites.—The nitrites are used chiefly in angina pectoris and related angiospastic disorders, and also widely for arterial hypertension.[3] They produce vasodilatation and often lower the arterial blood pressure. They tend to depress renal function.

Soma Weiss and associates[4] have studied the nature of the circulatory collapse after the administration of sodium nitrite to normal human adults. They report that collapse depends upon the position of the body. In normals lying down

1. Tyson, T. L.; and West, R.: The Effect of Trypsin on the Clotting of the Blood in Hemophilia. Proc. Soc. Exper. Biol. & Med., **36**:494 (May) 1937.

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the drug causes no harm. In normals upright, it is followed by vasomotor collapse, often terminating in syncope. The degree of collapse may be controlled at will by altering the position of the subject. They report that it is apt to be harmful in the treatment of hypertension.

IRVIN ABELL, PRESIDENT-ELECT OF THE AMERICAN MEDICAL ASSOCIATION

Again an ex-president and member of long standing of the Southern Medical Association has been chosen to head the national organization. Dr. Irvin Abell, of Louisville, served as President of the Southern Medical Association in 1933, four years ago. At the recent Atlantic City session of the American Medical Association he was elected to its highest office by acclamation. This is the first time in many years that a president of this organization has been chosen without an opposing candidate.

His distinguished standing as a surgeon, very pleasing personality, business ability, and the unqualified respect and confidence of his colleagues have given Dr. Abell this well deserved honor.

The new President-Elect received his early primary and technical education in Kentucky, his graduate medical education abroad, and he has practiced in Louisville since 1900. He has been Professor of Surgery at the University of Louisville School of Medicine since 1904. He served as Lieutenant Colonel in the Army Medical Corps in France during the World War. He has been a member of the House of Delegates of the American Medical Association almost continuously since 1922 and has been very active, serving as Chairman of many committees during the annual sessions. He has made numerous contributions to medical literature,[1] has addressed many medical gatherings on diverse subjects, and wherever he has spoken has attracted large and attentive audiences.

With Federal legislation on medical practice relentlessly impending, the next two years will be momentous for organized medicine. Gifted direction will be needed to maintain an orderly progress in the laws for the care of the indigent and of the middle class sick. It is gratifying that such men as Dr. Abell may have a hand in framing these regulations.

TWENTY-FIVE YEARS AGO

From Journals of 1912

The Dentist and Asepsis.[2]—"Have we, as practitioners of an important specialty of the healing art, a proper sense of sepsis? * * * I have visited the offices of many dental practitioners in which there was no provision for sterilizing instruments. * * * I have been invited to examine a case, and after carefully washing my hands and sterilizing them with alcohol, have been offered a soiled towel to dry them with. * * * I have witnessed at the public clinics given by various state societies and at the clinics of the National Dental Association the same disregard of aseptic methods. * * * Twice in my professional life I have been a patient at the clinics of the National Dental Association and * * * I looked with fear and trembling at the dirty fingers thrust into my mouth by the interested spectators."

Inclusion Bodies in Scarlet Fever.[3]—"With the purpose of testing Dohle's findings, I have studied blood smears from fifty-one scarlet fever patients, together with twenty-five controls, with the result that fifty-five scarlet fever patients showed inclusion bodies such as Dohle has described, and six failed to do so. * * * It seems that we have in the blood examination of suspected scarlet fever patients an extremely valuable method of differential diagnosis between this disease and nearly all of the conditions which resemble it."

1. Editorial, The Journal, **26**:77 (Jan.) 1933.
2. Marshall, J. S.: Wanted: A Sense of Asepsia. J.A.M.A., **59**:97, 1912.
3. Nicolle, Jr., Matthias: J.A.M.A., **59**:60, 1912.

Cholera and Adrenal Insufficiency.[1]—"Piovesana emphasizes certain features in common between Addison's disease, the syndrome observed after removal of the adrenals, and cholera. The resemblance in certain points is so marked that it suggests that cholera may be merely an acute specific enteritis with toxic symptoms on the part of the nervous system, especially of the innervation of the cardiovascular apparatus, due to deficient adrenal functioning. On this assumption the logical treatment of cholera would be to supply the lacking internal secretion of the adrenals. He reports nine cases in which he applied treatment on this basis, after considerable confirmatory animal experimentation. * * * He thinks the results justify further trials of epinephrin in treatment of cholera, not shrinking from large doses."

Treatment of Septic Thrombophlebitis of Puerperal Origin.[2]—"The task of formulating the indications for the surgical treatment of puerperal septic infection still affords a source of prolific discussion. It seems impossible to agree on established rules as has been done in supurative appendicitis, gallbladder infection, or suppurative otitis media. Some of the confusion has undoubtedly arisen from the fact that we have no reliable clinical or laboratory guide to aid us in determining a reasonable prognosis, from the difficulty of differentiating the complex lesions, and to a certain extent from the antipathy for serious surgical operations on the lying-in woman. * * *

"The keen interest in this subject was undoubtedly aroused by the success of the aural surgeons in the treatment of all otitic pyemia by exposing and clearing out the thrombosed transverse sinus with or without ligation of the jugular vein. * * * It is quite natural to inquire why the same plan of treatment is not applicable to cases of puerperal origin. * * * Trendelenburg, in 1907, collected reports of seven cases in which operation resulted in cure. Seitz, in the same year, published a statistical study of thirty-seven cases. In 1909, Williams collected reports of fifty-six cases."

1. Current Medical Literature. J.A.M.A., **59**:77, 1912.

2. Miller, C. Jeff: The Present Status of Ligation or Excision of the Pelvic Veins in the Treatment of Septic Thrombophlebitis of Puerperal Origin. J.A.M.A., **59**:157, 1912.

Book Reviews

Medical Morals and Manners. By Hubert Ashley Royster, M.D. 333 pages. Chapel Hill: The University of North Carolina Press, 1937. Cloth $2.50.

This distinguished surgeon, in addition to strictly professional activities over a period of forty years, is possessed of the type of mind which has permitted him to maintain interest in these human activities which have to do with matters hygienic, sociological, cultural and historical.

His outlook is distinctly philosophic and his views are interestingly adapted to present day problems.

This volume is a compilation of addresses and papers which have been delivered before medical, lay or historical societies or which have appeared in their magazines.

While every paper is of interest to the physician and surgeon, Chapters 1, 2, 3 contain addresses of special interest to the lay reader. The papers in Chapter 4 deal with hospital problems.

Chapter 5 is historical and reminiscent. In it we find papers on J. Marion Sims, Budd of Chatham, and Edmund Strudwick, surgeon. Delightfully reminiscent is his "Recollections of the North Carolina Board of Medical Examiners of 1894," a most important period in the author's professional career when he faced the last barrier which separated him from full recognition as a licensed practitioner of medicine.

"Leaves from My Father's notebook" gives a vivid account of the labors and accomplishments of a busy and successful physician who graduated in 1868; while "The Medical Phrases of Victor Hugo," read before the Harvard Medical History Club, is brilliant and profound commentary on the medical knowledge of the great French novelist.

Handbook of Orthopedic Surgery. By Alfred Rives Shands, Jr., B.A., M.D., Associate Professor of Surgery in Charge of Orthopedic Surgery, Duke University School of Medicine, and Chief of the Orthopedic Service, Duke Hospital, Durham, North Carolina. In Collaboration with Richard Beverly Raney, B.A., M.D., Instructor in Orthopedic Surgery, Duke University School of Medicine. 593 pages, illustrated. St. Louis: The C. V. Mosby Company, 1937. Cloth $5.00.

The author has fully accomplished his desire in publishing a text book of orthopedic surgery for the medical student and general practitioner. The subject matter has been divided into twenty-four chapters in accordance with a report of the Committee on Undergraduate Instruction in Orthopedic Surgery. The text was criticized freely by able orthopedic surgeons before publication. All photographs and roentgenograms have been redrawn to emphasize their characteristic features.

Very few subjects have been omitted except for plaster technic and orthopedic appliances. All are briefly treated, as they should be for the student. For one who desires further knowledge, there is an extensive bibliography quoting many well chosen and outstanding American and English authors.

Source Book of Orthopedics. By Edgar M. Bick, M.A., M.D., Adjunct Orthopedic Surgeon, Hospital for Joint Diseases and Mt. Sinai Hospital. Attending Orthopedic Surgeon, Lutheran Hospital, Fellow in Orthopedic Surgery, New York Academy of Medicine. 376 pages. Baltimore: The Williams & Wilkins Company, 1937. Cloth $4.00.

Dr. Bick offers to members of the orthopedic profession a book of both interest and knowledge; he has given to those of the medical profession in general a book of historical facts. One immediately recognizes the author's thorough knowledge of his subject, and his extensive bibliography is evidence of the time and effort spent in preparing the book.

The subject is introduced with facts taken from the era of primitive man, but more extensively from early Greek and Roman medicine. The Corpus Hippocrates and Galen are quoted frequently, and it is surprising to note how commonly our fundamental principles of today were practiced many years ago. It is pointed out that

orthopedic surgery developed from Greek and Roman practice and that special emphasis was not placed on it as a specialty until the Eighteenth Century.

The greater portion of the book is given over to "Modern Times" or developments of the Nineteenth and Twentieth Centuries, and deals with the growth and sources of special subjects; the work of individual practitioners is pointed out. After thoroughly developing and discussing the physiology and pathology of orthopedics, the author chooses to discuss individual subjects within the field of orthopedics from the standpoint of time within the modern era.

To the younger man this book which deals with the facts which have stimulated and guided the evolution of orthopedic surgery during the past and which gives the developmental trend, offers a broadened outlook and more sensitive perspective of orthopedic surgery.

Postmortem Appearances. By Joan M. Ross, M.D., B.S. (Lond.), M.R.C.S., L.R.C.P., Reader in Pathology, University of London; Morbid Anatomist to Royal Free Hospital; Late Assistant Pathologist to St. Mary's Hospital. With Preface by E. H. Kettle, M.D., Professor of Pathology and Bacteriology, Welsh National School of Medicine, Cardiff. Third Edition. 240 pages. New York: Oxford University Press, 1937. Cloth $2.50.

This little book of 240 pages, small enough to slip into a coat pocket, tells how to perform an autopsy and describes the lesions characteristic of the commoner diseases as well as those found after death from physical and chemical causes. The style is clear, the descriptions are concise and there is no waste effort over non-essentials. While no attempt is made to cover the entire field of pathology, there is a surprising width of coverage in small compass. Five appendices tabulate the sizes and weights of the organs, the length and weight of the fetus at varying ages, the organ weights of the new born child and the dates of ossification of the bones during intra- and extra-uterine life. That the book is now in its third edition is evidence of its practical value. It should be especially useful to the student as a handy guide at the autopsy table and to the practitioner who is called upon only occasionally to perform an autopsy and to interpret the changes that he observes.

The Diseases of Infants and Children. By J. P. Crozer Griffith, M.D., Ph.D., Emeritus Professor of Pediatrics in the University of Pennsylvania, and A. Graeme Mitchell, M.D., B. K. Rachford Professor of Pediatrics, College of Medicine, University of Cincinnati, Medical Director and Chief of Staff of the Children's Hospital of Cincinnati; Director of the Children's Hospital Research Foundation; Director of Pediatric and Contagious Services in the Cincinnati General Hospital. Second Edition. 1153 pages, illustrated. Philadelphia: W. B. Saunders Company, 1937. Cloth $10.00.

The fact that a second edition of Griffith and Mitchell is found to be necessary in a period of four years is evidence of its excellence. This book is at the present time one of the most authoritative and complete works on pediatrics published in the English language. It is without a peer as a text book for medical students, and reference work for the general practitioner. Those specializing in diseases of children will also find it of exceptional value. In the revision the chapters on anatomy and physiology and growth and development have been amplified and emphasized. The subject of infant feeding has been greatly simplified and the principles are set forth in a manner which is readily understood. The whole chapter on tuberculosis has been rewritten and brought into conformity with the modern conception of this disease. The modern methods of treating the disturbances of the acid-base balance have been stressed. The bibliographies which appear at the end of each chapter are thoroughly up to date and should be of great value to anyone desiring to acquaint himself further with a particular subject. No condition, however rare, encountered in pediatrics is overlooked in the text and each receives the importance which the subject deserves. On the whole no word of praise can be too extravagant in describing this complete work and commending it to teachers, pediatricians and physicians in general .

An Introduction to Pharmacology and Therapeutics. By J. A. Gunn, M.A., M.D., D.Sc., F.R.C.P., Professor of Pharmacology and Director of the Nuffield Institute for Medical Research, University of Oxford. Fifth Edition. 240 pages. London: Oxford University Press, 1936.

The writer has made no extensive revisions in this edition, merely making changes to conform to the new United States Pharmacopeia, XI, 1936.

A very helpful book to aid in learning the essentials of pharmacology.

An Introduction to General Practice. By E. Kaye Le Fleming, M.A., M.D., Chairman of Council, British Medical Association; Direct Representative, General Medical Council; Chairman of the Conference of Local Medical and Panel Committees, 1925-1930; Chairman, Representative Body, B.M.A., 1931-1934. 150 pages. Baltimore: William Wood & Co., 1937. Cloth $2.00.

This book contains some excellent advice for the young practitioner. However, the volume is written entirely from the viewpoint of and for the British practitioner. It tells of his relationship to the General Medical Council, the types of practice that are open to him, his relationship to his colleagues, the chemist and the patient. In this country it is of little more than academic interest.

Surgical Pathology of the Thyroid Gland. By Arthur E. Hertzler, M.D., Surgeon to the Agnes Hertzler Memorial Hospital, Halstead, Kansas, Professor of Surgery, University of Kansas. 298 pages, illustrated. Philadelphia: J. B. Lippincott Company, 1937. Cloth.

Sufficient introduction for the present volume is the statement that it fully maintains the Hertzler type tradition. Always original and entertaining, the author here as in his previous monographs presents in his own inimitable style an earnest study of the thyroid dyscrasias. The attack is double-barreled, for the material has been studied in the laboratory as well as in the clinic. The opening chapter on "General Considerations" epitomizes the book and presents the cardinal principles of diagnosis and treatment. From the beginning emphasis is laid upon the danger of cardiac damage from thyroid

disease. "Goiter, whatever the type in the beginning, is a continuous process ending in the cardiotoxic state." Kocher's bogey of cardiexia thyreopriva is derided and demand is made for complete rather than partial thyroidectomy in disease states. Chapter 2 deals with the gross and microscopic structure of the thyroid and Chapter 3 with the general pathology of goiter. Every pathologist will agree with all that is said here, but at least the author has made a worthwhile effort at interpretation. There follow illuminating chapters on the different types of goiter, diffuse and nodular. They stress the continuity of the biological disturbances evident in the different types, their common heritage and eventual danger. There is a useful chapter on thyroiditis and a rather unusual treatment of the subject of myxedema. The two final chapters deal with fetal adenomas and tumors.

One may differ with the author on matters of detail or even with some of his larger conclusions, but no reader can fail to find here much that is stimulating and helpful. The author's conversational style, the occasional asides and original terms of expression make pleasant reading while detracting not at all from the obvious industry and earnestness that have gone into this first hand study of a very large problem. The book is beautifully illustrated.

New Twenty-Volume National Health Series: Exercise and Health. By Jesse Feiring Williams, A.B., M.D., Professor of Physical Education, Teachers College, Columbia University (Revised Edition). Venereal Diseases. By Wm. F. Snow, A.M., M.D., General Director, American Social Hygiene Association, New York (Revised Edition). How to Sleep and Rest Better. By Donald A. Laird, Ph.D., Sc.D., Professor of Psychology, Colgate University, Rivercrest Psychological Laboratory, Hamilton, N. Y. (Entirely New). Taking Care of Your Heart. By Stuart Hart, M.D., Consulting Physician, Presbyterian Hospital and Manhattan Eye, Ear and Throat Hospital, New York (Revised Edition). The Common Cold. By W. G. Smillie, M.D., Professor of Public Health Administration, School of Public Health, Harvard University, Boston, Massachusetts (Entirely New). The Common Health. By James A. Tobey, Dr. P.H., Director of the Department of Health Service, Borden Company, New York. The Healthy Child. By Henry L. K. Shaw, M.D., Clinical Professor, Diseases of Children, Albany Medical College, Albany, New York. The Expectant Mother and Her Baby. By Robert T. DeNormandie, M.D., F.A.C.S. Adolescence Educational and Hygienic Problems. By Maurice A. Bigelow, Ph.D., Sc.D., Professor of Biology and Director of the Institute of Practical Science Research, Teachers College, Columbia University. What You Should Know About Eyes. By Park Lewis, M.D., F.A.C.S., Vice-President, National Society for the Prevention of Blindness; Consulting Surgeon, Buffalo State Hospital. New York: Funk & Wagnalls Company, Publishers, 1937. Cloth $.35 per volume, 3 for $1.00.

"The Common Cold" defines a cold, discusses the causes and prevalence. Summarizes the present knowledge of prevention and advocates isolation and rest as the best treatment.

"Venereal Disease" candidly sets forth the reasons why venereal infections are a personal, family and community problem and acquaints the reader with the importance of early adequate treatment.

In "How to Sleep and Rest Better" the physiological aspects and the importance of sleep are stressed. The author delineates methods of gaining sufficient restful sleep.

"What You Should Know About Eyes" explains to the student the mechanism of sight, the senescence of the eye and the importance of well fitting glasses.

"The Common Health" gives the importance of hygiene in the home and community. The book also summarizes the activities of those agencies devoted to community health.

"Taking Care of Your Heart" discusses heart disease as more than an individual problem. It tells how to prevent heart disease, but if present, how to live with it.

In "Adolescence" the problems discussed are mainly those of growth, sex and education.

"The Expectant Mother and Her Baby" contains all the patient should know about herself at this trying period. It will be very useful for the young mother.

"The Healthy Child" takes up the period from two until six and advises as to the care, feeding and prevention of disease of the toddler.

"Exercise and Health" shows the advantages of exercise in the production of a useful muscular development and outlines those exercises which should be given different individuals for special purposes.

These books are inexpensive, conservative and very brief. They are written for lay readers and can be recommended by the physician to his patient.

Aids to the Diagnosis and Treatment of Diseases of Children. By F. M. B. Allen, M.D., M.R.C.P., Lecturer in Infant Hygiene and Diseases of Children, Queen's University, Belfast; Assistant Physician, Belfast Hospital for Sick Children; Physician in charge of infants, Royal Maternity Hospital, Belfast. 329 pages. London: Bailliere, Tindall & Cox, 1937.

This is a small handy book published in England. The subject matter is condensed to such an extent that it will prove to be of little value to either students or others interested in pediatrics.

Southern Medical News

The American Congress of Physical Therapy will hold its sixteenth annual session in Cincinnati, Ohio, September 20 to 24. Among the officers of this group the following are from the South: Dr. Grant E. Ward, Baltimore, Maryland, Second Vice-President; Dr. Nathan H. Polmer, New Orleans, Louisiana, Fourth Vice-President; Dr. Val Parmley, Little Rock, Arkansas, Chairman, Southern Section; Dr. M. F. Lautman, Hot Springs National Park, Arkansas, Secretary, Southern Section.

ALABAMA

The Alabama State Medical Association has elected the following officers for the coming year: Dr. Edward S. Sledge, Mobile, President; Dr. Alvin B. Coxwell, Monroeville, Vice-President; Dr. Douglas L. Cannon, Montgomery, Secretary.

Dr. Albert C. Jackson, Jasper, has been made President of the Alabama Hospital Association.

Continued on page 26

FEED THE BABY

Dilution makes cow's milk more digestible — by attenuating somewhat the tough curd which characterizes cow's milk during digestion. But the milk-water-sugar formula still forms an appreciable curd . . . and the nutritional value of the mixture is further reduced by the dilution. Thus the usual "modification" as made in the home, if passably digestible, is commonly too low in caloric value. (Or too high in carbohydrate). ¶ Similac is cow's milk modified by laboratory methods. Not only are the fats, proteins and carbohydrate adjusted to approximately the percentages and nutritional values as in breast milk, but in addition the salt balance of the cow's milk is altered . . . SO THAT SIMILAC, LIKE BREAST MILK, STAYS LIQUID DURING DIGESTION. This is true of Similac no matter what concentration of the milk nutrients you find it advisable to prescribe. Because of this, the use of Similac reduces the occurrence of the difficult feeding cases which frequently result from underfeeding.

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Continued from page 768

Dr. Ben Neely Miller, formerly of Hickory Grove, South Carolina, has been made Instructor in Physiologic Chemistry at the University of Alabama School of Medicine, Tuscaloosa, to succeed Dr. Wallace S. Marshall, resigned.

Dr. Philip B. Armstrong, formerly Assistant Professor of Anatomy at Cornell University Medical College, New York, has been made Professor of Anatomy at the University of Alabama School of Medicine, to succeed Dr. Franklin S. DuBois, who will go to Rochester, Minnesota.

Dr. Holland Thompson, formerly of Northville, Michigan, has been made Tuberculosis Clinician of the Alabama State Department of Health.

Dr. James O. Colley, Jr., Troy, has been made Physician to the Troy State Teachers College to succeed Dr. William Shelby Sanders, resigned.

Dr. Abraham I. Perley, Coleanor, has been made Health Officer of Chambers County to succeed Dr. Chester E. Johnson, Jr., resigned.

Deaths

Dr. Walter Taylor Miller, Fort Payne, aged 52, died February 27 of cerebral hemorrhage.

Dr. Richard Lafayette Miller, Florala, aged 83, died February 22 of chronic myocarditis.

Dr. Marvin Ward Dupree, Athens, aged 57, died March 13 of carcinoma of the stomach.

Dr. Ashley Darling James, Choctaw, aged 60, died March 25.

Dr. Coleman Ferrell Pearson, Montgomery, aged 60, died March 4.

Dr. Thomas J. Wilkinson, Athens, aged 66, died February 10.

Dr. C. Hilton Rice, Montgomery, aged 57, died May 27 from a heart attack.

ARKANSAS

Dr. R. H. Johnson, Clarkesville, has been made Health Officer of Johnson County.

Dr. John B. Elders, Paragould, has been made Medical Director of Health District No. 12.

Dr. E. W. Pillstrom, Coal Hill, has been made Health Officer of that city.

Dr. J. S. Miller, Parkin, has been made a member of the Cross County Welfare Board.

Dr. Berry Moore, El Dorado, has been made Vice-President of the Lions Club of that city.

Dr. C. M. Harwell has been made President of the Osceola Rotary Club.

Dr. E. A. Callahan, Carlisle, has been made President of the School Board of that city.

Dr. Hoyt Allen has been made Sergeant-at-Arms of the Little Rock Rotary Club.

Dr. S. J. Wolfermann, Fort Smith, has been made President of the Rotary Club of that city.

Dr. Walter G. Eberle, Fort Smith, has been made a member of the State Board of Nursing Examiners.

Dr. Wylie R. Felts, Judsonia, has been made Mayor of that city.

Dr. S. G. Daniels, Marshall, has been made a Trustee of the Clinton Vocation Educational School.

Dr. E. Close, Jerusalem, has been made Chairman of the Welfare Board of Conway County.

Dr. Allie C. Kolb, Little Rock, has resigned as Superintendent of the State Hospital at Little Rock.

Dr. F. C. Mullins, formerly of Wicks, has moved to Grannis.

Dr. N. G. Partee, formerly of Stephens, has moved to Camden.

Deaths

Dr. Alexander Hamilton Brown, Little Rock, aged 62, died March 1.

Dr. B. N. Spears, Junction City, died February 20.

Dr. Horace R. McCarroll, Walnut Ridge, aged 65, died March 4 of myocarditis, hypertension and arteriosclerosis.

Dr. Walter M. Chavis, Pine Bluff, aged 59, died March 14 of cerebral hemorrhage.

Dr. G. W. Yates, Hector, aged 67, died February 18 of cerebral hemorrhage.

Dr. Charles W. Horton, Hiwassee, aged 65, died April 28.

Dr. James Daniel Mooney, Coal Hill, aged 67, died April 30.

Continued on page 28

THE NEW YORK POLYCLINIC
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An intensive course. Surgical treatment of chronic suppuration of the lung (pulmonary tuberculosis, abscess of the lung, bronchiectasis) and tumors of the lung. Surgical lesions of the esophagus, heart and diaphragm. Empyemas. Witnessing of operations, cadaver operations, pathologic physiology, experimental surgery and bedside rounds. Indications for surgical treatment, pre-operative care and post-operative management.

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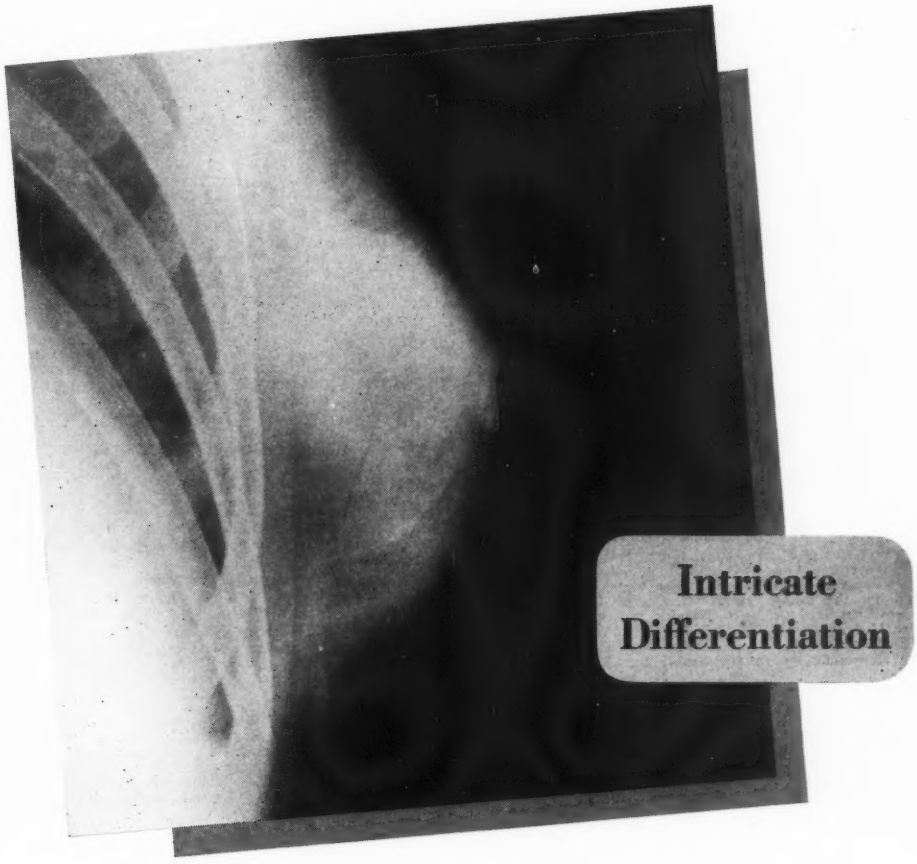

A WOMAN patient complains of pain or swelling in the breast, with other minor clinical symptoms. Is it chronic mastitis . . . cystic mastitis . . . tumor . . . abscess . . . hematoma . . . developing fibrosis . . . early carcinoma? The physician is confronted with a difficult problem in such a situation. A diagnosis based on clinical signs alone may lead to mistaken conclusions.

It was not long ago that biopsy or operative removal of the breast was the only alternative in questionable cases. But radiography now has brought new facility and certainty to both differentiation and treatment of diseases of this region. Through its use, a precise diagnosis often can be made . . . clinical findings confirmed . . . additional important data, not obtainable in any other manner, brought to light.

The radiologist's service is of unquestionable value in checking conclusions and establishing the actual condition in breast involvements. Eastman Kodak Company, *Medical Division*, Rochester, N. Y.

RADIOGRAPHS PROVIDE DIAGNOSTIC FACTS

Continued from page 26

DISTRICT OF COLUMBIA

The Medical Society of the District of Columbia has elected the following officers for the coming year: Dr. Thomas Edwin Neill, President; Dr. Daniel Bruce Moffett, First Vice-President; Dr. Jacob Kotz, Second Vice-President; Dr. Coursen B. Conklin, Secretary-Treasurer.

Dr. Maurice L. Townsend and Miss Nell Hamlin, both of Washington, were married February 18.

Deaths

Dr. W. H. R. Brandenburg, Washington, aged 60, died May 11.

FLORIDA

Dr. T. Z. Cason, Jacksonville, has been made a member of the Board of Governors of the American College of Physicians.

Dr. L. M. Anderson, Lake City, has been made Inspector of State Institutions and Administration Advisor by the State Board of Health.

Dr. William S. Manning, Jacksonville, has been made President of the Jacksonville Chapter, Reserve Officers' Association, United States Army.

Dr. A. Boynton Wilber has opened offices in Palm Beach.

Dr. Carlos P. Lamar, Miami, and Miss Celita Fernandez Renedo were married April 24.

Deaths

Dr. Wesley Sherman Miller, Palatka, aged 54, died March 5 of angina pectoris.

Dr. Samuel C. Wood, Leesburg, aged 61, died March 30 of pneumonia.

GEORGIA

The Georgia State Medical Association has elected the following officers for the coming year: Dr. Grady N. Coker, Canton, President-Elect; Dr. George A. Traylor, Augusta, President; Dr. Charles Hall Farmer, Macon, and Dr. Hulett A. Askew, Atlanta, Vice-Presidents.

The Morgan County Medical Society has elected the following officers for the coming year: Dr. W. M. Fambrough, Bostwick, President; Dr. D. M. Carter, Madison, Vice-President; Dr. W. C. McGeary, Madison, Secretary-Treasurer.

The Muscogee County Medical Society has elected the following officers for the coming year: Dr. G. S. Murray, Columbus, President; Dr. J. H. Gaston, Columbus, Secretary-Treasurer.

The Sumter County Medical Society has elected the following officers for the coming year: Dr. R. C. Pendergrass, Americus, President; Dr. L. S. Boyette, Ellaville, Vice-President; Dr. J. R. Lavender, Americus, Secretary-Treasurer.

The Ware County Medical Society has elected the following officers for the coming year: Dr. W. L. Pomeroy, Waycross, President; Dr. H. A. Seaman, Waycross, Vice-President; Dr. Kenneth McCullough, Waycross, Secretary-Treasurer.

The Surgical Association of the Atlanta and West Point Railroad, the Western Railway of Alabama and the Georgia Railroad has elected the following officers for the coming year: Dr. Richard Binion, Milledgeville, President, and Dr. R. H. Fike, Atlanta, Vice-President.

Dr. R. P. Adams, formerly of Winder, has moved to Atlanta.

Dr. George C. Brooke, Canton, has returned after taking postgraduate work in New Orleans.

Dr. D. S. Reese, Carrollton, has returned after taking postgraduate work in Chicago.

Dr. Aldwin George Funderburk, Moultrie, and Miss Louise Canipe were married recently.

Deaths

Dr. John W. Harper, Hampton, aged 62, died March 22.

Dr. Howell Cobb Strickland, Gillsville, aged 76, died February 26.

Dr. John R. Graves, Zebulon, aged 66, died March 30 of cerebral hemorrhage and chronic nephritis.

Dr. Marion A. Born, Athens, aged 64, died March 23 of aneurysm of the aorta and pellagra.

Dr. Willis J. Bryant, Summerville, aged 83, died April 5.

Dr. Marion J. Nicholson, Stephens, aged 75, died March 20.

Dr. George E. Youmans, Adrian, aged 61, died April 9.

Dr. Ralph Freeman, Hoschton, aged 53, died April 13.

Dr. Lewis J. Blanton, Atlanta, aged 76, died April 4.

Dr. Charles Benjamin Almand, Winder, aged 67, died April 16.

Dr. Jefferson Davis, Toccoa, aged 71, died March 30.

KENTUCKY

The Shelby County Medical Society has elected the following officers for the coming year: Dr. A. P. Dowden, Eminence, President; Dr. B. B. Sledd, Middletown, Vice-President; Dr. A. D. Doak, Shelbyville, Secretary-Treasurer.

Deaths

Dr. John Joseph Carroll, Covington, aged 48, died March 21 of pneumonia.

Dr. William Henry Forgy, Elkton, aged 86, died March 9 of senility.

Dr. Noble Smith Howard, Harlan, aged 77, died March 5 of coronary occlusion.

Dr. E. Curtis Gevedon, Grassy Creek, aged 66, died March 14 of pneumonia.

Dr. Elkanah B. Head, Franklin, aged 88, died March 16.

Dr. William B. Stokes, Farmington, aged 75, died February 27 of pneumonia.

Dr. Benjamin Hobson Frayser, Lexington, aged 49, died March 5 of carcinoma of the descending colon.

Dr. Gilbert Langdon Bailey, Lexington, aged 65, died March 5 of coronary occlusion.

Dr. J. J. Wakefield, Bloomfield, aged 84, died March 23 from injuries received in an automobile accident.

LOUISIANA

The Iberville Parish Medical Society has elected the following officers for the coming year: Dr. J. C. Eby, Plaquemine, President; Dr. R. J. Spedale, Plaquemine, Vice-President; Dr. W. E. Barker, Jr., Plaquemine, Secretary-Treasurer.

Deaths

Dr. Oscar E. Glover, Bernice, aged 64, died March 3 of coronary thrombosis.

Dr. William Thomas Williams, Natchitoches, aged 78, died February 17 of heart disease and arteriosclerosis.

Continued on page 30

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Continued from page 28

Dr. James Alfred Young, Bunkie, aged 65, died March 6 of uremia and nephritis.

Dr. Theophile Albert Combre, Lake Charles, aged 46, died in March of pulmonary tuberculosis.

MARYLAND

The Medical and Chirurgical Faculty of Maryland has elected the following officers for the year 1938: Dr. Frank B. Hines, Chestertown, President; Dr. Frank S. Lynn, Baltimore, Dr. Richard C. Dodson, Rising Sun, Dr. Everard Briscoe, Prince Frederick, Vice-Presidents; Dr. Walter D. Wise, Baltimore, Secretary; Dr. Joseph Albert Chatard, Baltimore, Treasurer.

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FOR RENT—Offices formerly occupied by the late Dr. E. B. Bailey, Demopolis, Alabama. Demopolis is an ideal location for a physician with surgical inclination. Only three physicians here. Territory contains more than fifteen thousand inhabitants. Very reasonable rent required. Mrs. E. B. Bailey, Demopolis, Ala.

Dr. George A. Harrop, Baltimore, has been made Director of Research on the staff of E. R. Squibb & Sons.

DEATHS

Dr. Harry G. Spurrier, Brookeville, aged 70, died February 12 of coronary thrombosis.

Dr. Irvin M. Wertz, Hagerstown, aged 64, died February 23.

MISSISSIPPI

The Mississippi State Medical Association has elected the following officers for the coming year: Dr. Joseph E. Green, Laurel, President-Elect; Dr. W. L. Little, Wesson, President; Dr. F. S. Hill, Grenada, Dr. Lawrence W. Long, Jackson, Dr. R. F. Ratcliff, Lucedale, Vice-Presidents; Dr. T. M. Dye, Clarksdale, Secretary.

Dr. Clarence D. Prichard, formerly of Memphis, has moved to Lambert.

Dr. John F. Lucas and Dr. R. E. Wilson, formerly of Greenville, have moved to Greenwood.

Dr. D. T. Meriwether, formerly of Senatobia, has moved to Doddsville.

DEATHS

Dr. Ledru White Bayne, Hattiesburg, aged 65, died March 20 of heart disease.

Dr. Madison Lafayette Reed, Tilden, aged 84, died February 24 of carcinoma of the rectum.

MISSOURI

The St. Louis Clinics Conference was held May 24-29 with an attendance of two hundred and three from the following states: Arkansas, California, Oklahoma, Indiana, Illinois, Missouri, Tennessee, Idaho, Kentucky, Ohio, Wisconsin, Texas, Kansas, Iowa, Nebraska and the Dominion of Canada. An outstanding feature of the six full days and five evenings of clinics and demonstrations was service talks and demonstrations given by members of the Army and Navy of the Seventh Corps Area.

The Missouri State Medical Association has elected the following officers for the coming year: Dr. B. W. Hays, Jackson, President-Elect; Dr. Dudley S. Conley, Columbia, President; Dr. W. A. Bloom, Fayette, Dr. E. L. Johnson, Concordia, Dr. S. E. Mitchell, Maldon, Vice-Presidents; Dr. E. J. Goodwin, St. Louis, Secretary-Editor; Mr. E. H. Bartelsmeyer, St. Louis, Secretary and Business Manager; Dr. John R. Caulk, St. Louis, Treasurer.

The Pemiscot County Medical Society has elected the following officers for the coming year: Dr. J. R. Pinion, Caruthersville, President; Dr. Philip Aquino, Caruthersville, Vice-President; Dr. W. R. Limbaugh, Hayti, Secretary-Treasurer.

The Scott County Medical Society has elected the following officers for the coming year: Dr. E. J. Nienstedt, Sikeston, President; Dr. A. E. Lee, Illmo, Vice-President; Dr. U. P. Haw, Benton, Secretary.

The Vernon-Cedar County Medical Society has elected the following officers for the coming year: Dr. John S. Newlon, Nevada, President-Elect; Dr. R. W. Pearse, Jr., Nevada, Secretary-Treasurer.

Dr. Rutherford B. H. Gradwohl, St. Louis, has resigned as Director of the Laboratory and as member of the staff of the

Continued on page 32

The "MESCO" Laboratories manufacture the largest line of Ointments in the world. Sixty different kinds. We are originators of the Professional Package. Specify "MESCO" when prescribing ointments. Send for lists.

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Natural and Chocolate Flavors

HORLICK'S MALTED MILK CORP.
Racine, Wisconsin

Continued from page 30

Department of Pathology and Bacteriology of the St. Louis County Hospital, being succeeded by Dr. Hollis N. Allen.

Dr. Malvern B. Clopton, Clarksville, has been made a member of the State Board of Health.

Dr. Nathan Anthony Womack, St. Louis, and Miss Margaret Elizabeth Richardson were married recently.

DEATHS

Dr. Jesse Robert Haley, Brookfield, aged 35, died February 14 of streptococcus septicemia.

Dr. Conrad Emil Thomas, St. Joseph, aged 69, died February 26 of pneumonia.

Dr. Columbus C. Sheets, Ellsinore, aged 75, died February 23 of bronchopneumonia and cerebral hemorrhage.

Dr. Frederick C. Barker, Kansas City, aged 53, died February 28 of coronary occlusion.

Dr. William Casey Ingram, Lanagan, aged 73, died March 12.

Dr. Leonard Francis Cruse, Osage, aged 59, died March 20 of cerebral hemorrhage.

Dr. Mae Sherer Harris, St. Louis, aged 68, died March 22 of intestinal obstruction.

Dr. Thomas H. Diven, St. Louis, aged 67, died March 22 of pneumonia.

Dr. Henry A. Cox, Rayville, aged 58, died March 26 of hypostatic pneumonia and myocarditis.

Dr. Joseph Sanders Strother, Blue Springs, aged 79, died March 1 of coronary thrombosis and arteriosclerosis.

Dr. Allen Wilson, St. Louis, aged 87, died March 3 of asthma.

Dr. John Buchanan Wright, Trenton, aged 77, died April 19.

Dr. W. E. Rudd, Salem, aged 66, died April 22 of a heart attack.

Dr. Wm. H. Bollinger, Seymour, aged 76, died March 19.

NORTH CAROLINA

The Eighth District Medical Society has elected the following officers for the coming year: Dr. P. A. Yoder, Winston-Salem, President; Dr. Samuel F. Ravenel, Greensboro, Vice-President; Dr. Eva F. Dodge, Winston-Salem, Secretary.

The Rockingham County Medical Society has elected the following officers for the coming year: Dr. C. R. Wharton, Ruffin, President; Dr. James M. McAnally, Reidsville, Secretary-Treasurer.

Dr. W. W. Green, Tarboro, has been made Chairman of the Board of Education of Edgecombe County.

Dr. Whitehead McKenzie, Salisbury, has been made President of the Medical Alumni of the University of North Carolina.

Dr. Olin W. Owen has opened offices in the First National Bank Building, Charlotte.

Dr. W. H. Kibler, Morganton, is taking postgraduate work in Boston.

Dr. William Blount Norment and Miss Katherine Williams, both of Greensboro, were married April 27.

Dr. Louis Carroll Roberts and Miss Jessie Speight Ward, both of Durham, were married April 23.

Dr. L. A. Coleman, Salisbury, and Miss Janet Monroe were married April 3.

DEATHS

Dr. Charles B. Lanneau, Flat Rock, aged 90, died March 6 of chronic myocarditis.

Dr. George Davis, Beaufort, aged 62, died in March of Hodgkin's disease.

Dr. Henry R. Hoover, Wilson, aged 76, died March 16.

Dr. Wayman C. Melvin, Linden, aged 62, died April 26 of pneumonia.

Dr. W. B. Murphy, Snow Hill, died May 4 from acute leukemia.

Dr. John E. Ashcraft, Fayetteville, died April 26.

OKLAHOMA

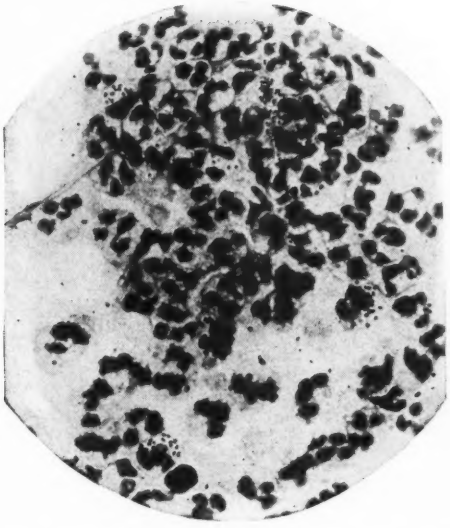
Dr. J. L. Adams, Hobart, has been made County Health Superintendent of Kiowa County.

Dr. Harry B. Hall, Boise City, has been made County Health Superintendent of Cimarron County.

DEATHS

Dr. Irvin Phillips, Picher, aged 79, died February 27 of cerebral hemorrhage.

Continued on page 34



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KEEN interest has been manifested in the published observations of Drs. J. E. Dees and J. A. C. Colston (*J.A.M.A.*, 108:1855, May 29, 1937) that gonorrhea can be cured with remarkable rapidity by the use of Prontylin. The cases dealt with comprised acute, subacute and chronic anterior and posterior urethritis, inguinal adenitis, urethral stricture, seminal vesiculitis, epididymitis and prostatitis.

Judging from confirmatory publications on the value of Prontosil in gonococcus infections, as well as from numerous unpublished experiences, it would seem that a revolutionary change is impending in the treatment of another plague of humanity.

DOSAGE SCHEME EMPLOYED

4 tablets 4 times daily for first 2 days	Total
3 tablets 4 times daily for next 3 days	100-132
2 tablets 4 times daily for 4 to 8 days	5 grain tablets

EXCELLENT TOLERANCE: With few exceptions, the foregoing doses were tolerated without side effects. Occasionally, the initial larger doses caused slight dizziness and lassitude, and in one instance fever and sulphemoglobinemia, which disappeared when the medication was reduced or discontinued.

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Prontosil Sterile Solution (2.5 per cent), ampules of 5 cc., boxes of 5 and 50; ampules of 10 cc., boxes of 5; bottles of 50 cc. with rubber diaphragm stopper.

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Continued from page 32

Dr. John C. Jacobs, Miami, aged 67, died April 2 of angina pectoris.

SOUTH CAROLINA

The Alumni Association of the Medical College of the State of South Carolina has elected the following officers for the coming year: Dr. William Weston, Columbia, President; Dr. W. E. Simpson, Rock Hill, Vice-President; Dr. A. T. Moore, Columbia, Secretary; Dr. F. L. Parker, Charleston, Treasurer.

Dr. Andrew J. Cauthen, Lake City, has been made Health Officer of Lancaster and Chesterfield Counties.

Dr. John M. Preston, Lancaster, has been made Head of the Tuberculosis Division of the State Department of Health.

Dr. James T. Quattlebaum, Columbia, has returned after taking postgraduate work in Rochester, Minnesota.

Dr. C. J. Scurry, Greenwood, is attending clinics in Europe.

TENNESSEE

The Tennessee State Medical Association has elected the following officers for the coming year: Dr. George C. Williamson, Columbia, President; Dr. F. K. West, Rossville, Dr. Jack Witherspoon, Nashville, Dr. Andrew Smith, Knoxville, Vice-Presidents; Dr. H. H. Shoulders, Nashville, Secretary-Editor.

Deaths

Dr. Robert Edward Harris, Kingston Springs, aged 72, died February 13.

Dr. Joseph Addison Lipscomb, Memphis, aged 94, died February 23 of bronchopneumonia.

Dr. George Washington Lancaster, Pisgah, aged 71, died March 7 of heart disease.

Dr. Frank Murtaugh, Jackson, aged 56, died March 3 of pneumonia.

Dr. Joseph I. Mitchell, Memphis, aged 41, died April 7 of acute intestinal obstruction.

Dr. Gross Long, Nashville, aged 46, died April 19.

Dr. C. V. Young, Lebanon, aged 69, died recently.

Dr. R. Q. Lillard, Lebanon, died May 3.

TEXAS

The Texas State Medical Association has elected the following officers for the coming year: Dr. Ernst W. Bertner, Houston, President; Dr. Craig W. Munter, Fort Worth, Dr. Robert B. Touchstone, Lytle, Dr. Harry L. Locker, Brownwood, Vice-Presidents; Dr. Holman Taylor, Fort Worth, Secretary.

The Dallas Obstetrical Society has elected the following officers for the coming year: Dr. Wayne T. Robinson, Chairman, Dr. Wyatt W. Winn, Vice-Chairman, Dr. H. F. Laramore, Secretary-Treasurer.

Dr. Milton C. Williams, San Marcos, has been made Health Officer of Hays County.

Dr. Philip S. Joseph, Alice, has been made Health Officer of Jim Wells County.

Dr. Jesse E. Ross, Jr., Henderson, has been named Health Officer of Rusk County.

Dr. Jack E. Frost, DeKalb, has been made Health Officer of Bowie County.

Dr. John W. Brown, formerly of Austin, has been made Health Officer of Houston.

Dr. John W. Tappan, El Paso, has been made Health Officer of the El Paso City and County Health Unit to succeed Dr. Thomas J. McCamant.

Dr. E. W. Wright, Bowie, has been made a member of the State Board of Health.

Dr. S. J. Alexander, Hearne, has been made a member of the State Board of Health to succeed Dr. C. M. Rosser, Dallas, resigned.

Dr. Edgar M. Dunstan, Dallas, has been made Superintendent

Continued on page 36

Replace SALT LOSS with kalak

During the hot weather, when dehydration and mineral loss are in evidence, the deficiency may be replaced quickly and effectively by Kalak Water.

Kalak is hypertonic, palatable, effervescent. Its composition is uniform and its alkali potency is constant.

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The Short Quinine Treatment as recommended by the Malaria Commission of the League of Nations, consists of a daily adult dose of 15 to 18 grains of quinine during 5 to 7 days; proportionate doses for children. After treatments are omitted, but all relapses are treated in the same manner.

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Continued from page 34

of the Dallas City-County Hospital System, succeeding Dr. J. H. Stephenson, resigned.

Dr. J. A. Leggett, Menard, has been made local physician for the Gulf, Colorado and Santa Fe Railroad.

Dr. Edward Randall, Galveston, has been made Chairman of the Board of Regents of the University of Texas.

Dr. R. A. Webb, Pampa, has been made Assistant Collaborating Epidemiologist in the United States Public Health Service.

Dr. H. Y. Swayze, Kerrville, has been made Superintendent of the Kerrville State Tuberculosis Sanatorium.

Dr. H. E. Griffin, Graham, has returned after taking postgraduate work in St. Louis.

Dr. Karl John Karnaky, Houston, has opened offices in the Medical Arts Building with practice limited to gynecology and obstetrics.

Dr. Eugene Chimene has moved from Austin to New York, New York.

Dr. Richard C. Bellamy has moved from Houston to Daisetta.

Dr. Phil A. Bleakney has moved from San Antonio to Harlingen.

Dr. Walter W. Brandes has moved from Dallas to Memphis, Tennessee.

Dr. J. M. Coleman has moved from Plano to Austin.

Dr. Edwin E. Connor has moved from Baytown to Pasadena.

Dr. A. B. Currie has moved from Junction to Lorenzo.

Dr. R. G. Giles has moved from Temple to San Antonio.

Dr. J. Campbell Kern has moved from San Angelo to Sanderson.

Dr. A. R. Lozano has moved from Harlingen to Montgomery, Alabama.

Dr. W. C. Middleton has moved from Beaumont to Logansport, Louisiana.

Dr. C. F. Miller has moved from Marlin to Hobbs, New Mexico.

Dr. N. T. Mulloy has moved from Post to Waco.

Dr. Tom M. Oliver has moved from Galveston to Nashville, Tennessee.

Dr. J. H. Payne has moved from Dimmitt to San Antonio.

Dr. John E. Quay has moved from San Antonio to Waco.

Dr. W. Arthur Smith has moved from San Antonio to Austin.

Dr. J. D. Stephens has moved from Weslaco to Smithville.

Dr. R. A. Tate has moved from Colmesneil to Talco.

Deaths

Dr. Henry L. Hilgartner, Sr., Austin, aged 63, died June 9 of coronary occlusion.

Dr. Robert Lee Glascock, San Antonio, aged 68, died March 23 of cerebral hemorrhage.

Dr. William Henry Doty, Sanderson, aged 66, died recently of pneumonia.

Dr. George Leonard Baber, Winnsboro, aged 55, died March 22.

Dr. Thomas D. Shotts, San Angelo, aged 48, died February 21 of heart disease.

Dr. Harold Atlin Winter, Houston, aged 44, died in February from injuries received in an automobile accident.

Dr. Alfred Thomas Triplett, Fort Worth, aged 78, died February 27 of coronary occlusion.

Dr. William Gammon, Galveston, aged 65, died March 9 of bronchopneumonia.

Dr. Ward Alma Snodgrass, Hamilton, aged 49, died February 14 of pneumonia.

Dr. Sterling Price Rumph, Baird, aged 57, died March 13 of acute nephritis.

Dr. Wilbert O. Brown, San Antonio, aged 68, died February 24 of heart disease.

Dr. John Harrison Hurt, Big Spring, aged 78, died March 22.

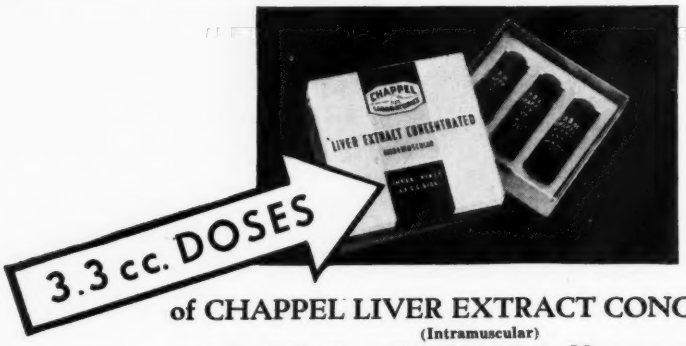
Dr. J. G. Smith, Port Arthur, aged 80, died January 3.

Dr. Bethume Freeman McDonald, Palestine, aged 44, died January 23 of heart disease.

Dr. F. Alsworth Waples, Houston, aged 67, died March 4.

Dr. Ezra L. Mead, Sulphur Bluff, aged 72, died March 3 of pneumonia.

Continued on page 38



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Especially for the patient who balks at numerous injections is Chappel Liver Extract Concentrated (intramuscular) recommended. Reticulocytosis is achieved in most cases of pernicious anemia with one 3.3 cc. injection. Three to five such doses at intervals of from 7 to 10 days usually result in a complete hematological recovery; adequate maintenance can be established with one 3.3 cc. injection at 3 to 6 week intervals.

Improved methods of extraction and refinement minimize irritation. Each lot of Chappel Liver Extract is tested in one of the largest anemia clinics in the U. S. before release. . . Supplied in packages of three 3.3 cc. vials.

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EDUCATION

Education is more than classroom exercise. In a broad sense, it is the development of all those natural faculties which dominate physical and mental character . . . Where physical education has been neglected as in the instance of constipation, wise counsel and selected treatment often expedite the return to normal function . . . As an adjunct to the treatment of diet and exercise, Petrolagar is a useful and convenient method of correcting constipation . . . By its bland lubricating action, Petrolagar produces soft well formed stools which are easy to evacuate. Petrolagar is prepared in five types — Plain, with Phenolphthalein, with Milk of Magnesia, Unsweetened and with Cascara — to provide a range of treatment adaptable to the individual patient. Petrolagar Laboratories, Inc., Chicago, Ill.

Petrolagar is a mechanical emulsion of pure liquid petrolatum (65% by volume) and agar-agar. Accepted by the Council on Pharmacy and Chemistry of the American Medical Association for the treatment of constipation.

Petrolagar

Continued from page 36

VIRGINIA

The University of Virginia Medical Society has elected the following officers for the coming year: Dr. Dudley C. Smith, President; Dr. Staige D. Blackford, Secretary-Treasurer.

The Amelia County Medical Society has elected the following officers for the coming year: Dr. G. A. Arhart, Amelia, President; Dr. H. C. Rucker, Mattoax, Vice-President; Dr. James L. Hamner, Mannboro, Secretary-Treasurer.

The Virginia Society of Oto-Laryngology and Ophthalmology has elected the following officers for the coming year: Dr. M. H. Hood, Portsmouth, President; Dr. G. G. Hankins, Newport News, Vice-President; Dr. Charles T. St. Clair, Bluefield, Secretary-Treasurer.

The Roanoke Academy of Medicine has elected the following officers for the coming year: Dr. H. H. Westcott, President; Dr. W. W. S. Butler, Jr., Dr. T. J. Hughes, Vice-Presidents; Dr. C. T. Burton, Secretary-Treasurer.

The South Piedmont Medical Society has elected the following officers for the coming year: Dr. A. P. Bohannon, Virgilina, President; Dr. W. R. Martin, Charlotte, Dr. W. Lloyd Eastlack, South Boston, Dr. Ernest G. Scott, Lynchburg, Dr. W. W. Robertson, Danville, Vice-Presidents; Dr. John A. Owen, Turbeville, Secretary-Treasurer.

The Alleghany-Bath County Medical Society has elected the following officers for the coming year: Dr. Thomas M. Winn, Covington, President; Dr. R. L. Claterbaugh, Clifton Forge, Vice-President; Dr. R. P. Hawkins, Clifton Forge, Secretary-Treasurer.

Dr. R. V. Funsten has been made Vice-President of the Charlottesville Rotary Club for the coming year.

Dr. James D. Clements, Ordinary, has been made President of the Gloucester Rotary Club.

Dr. O. W. Ward, Hampton, has been made Vice-President of the Bank of Phoebus.

The Medical College of Virginia, Richmond, conferred the honorary degree of Doctor of Science upon Dr. Irl C. Riggin, Richmond, at the recent commencement exercises.

Dr. Douglas F. Love, formerly of Bramwell, West Virginia, has moved to Harman.

Dr. Herman H. Hines, formerly of Clinchco, has moved to Pardee.

Dr. William Patton McDowell, Norfolk, and Mrs. Loula Dean Rees were married recently.

Dr. Charles Allen Easley, Jr., and Miss Elizabeth Stone Fitzgerald, both of Chatham, were married May 22.

DEATHS

Dr. Ben P. Sanders, Chilhowie, aged 81, died February 6 of senile dementia.

Dr. Stafford G. Cooke, Yorktown, aged 76, died March 2.

Dr. John Blair Spencer, Gloucester, aged 55, died April 30.

Dr. Marion Edmond, Eagle Rock, aged 59, died April 25.

Dr. William Hall Goodwin, Charlottesville, aged 55, died recently.

WEST VIRGINIA

The West Virginia State Medical Association has elected the following officers for the coming year: Dr. Charles W. Waddell, Fairmont, President; Dr. H. H. Haynes, Clarksburg, First Vice-President; Dr. A. A. Shawkey, Charleston, Second Vice-President; Dr. T. M. Barber, Charleston, Treasurer.

Dr. Fletcher J. Wright, Jr., formerly of Princeton, has moved to Petersburg, Virginia.

Dr. Douglas F. Love, formerly of Bramwell, has moved to Harman, Virginia.

Dr. James Beebe Hawes, Charleston, and Miss Helen Forbes White were married April 28.

DEATHS

Dr. Samuel Henry Hartwell, Bellepoint, aged 81, died recently of myocarditis.

Dr. James D. Schmied, New Martinsville, aged 67, died February 24 of cerebral hemorrhage.

Dr. George L. Summers, Huntington, aged 68, died February 2 of coronary disease.

Dr. Charles L. Muhleman, Parkersburg, aged 82, died February 13.

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When menstruation fails to appear or is scanty and irregular and associated with low metabolism, obesity or hypothyroidism, prescribe

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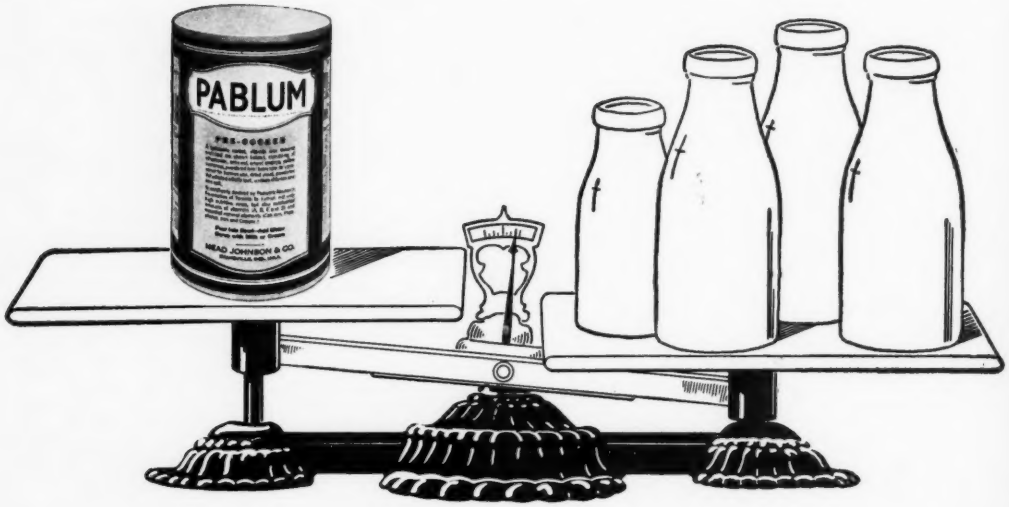

RICH IN IRON AND VITAMIN B, PABLUM COMPLEMENTS MILK

PABLUM is a distinct aid in the ever-present problem of persuading children to take more milk. So porous is Pablum that when mixed to the consistency of ordinary hot cooked cereals it holds 7 times its weight in milk—before being served with added milk and sugar. Pablum is not only an excellent carrier for the high food values which make milk indispensable in the child's diet, but in addition Pablum complements milk. The latter, although regarded as a nearly perfect food, is recognized as being deficient in iron and in vitamin B, both highly essential to the growing child. These deficiencies are corrected when milk is combined with Pablum, the latter furnishing 8½ mg. iron per ounce and an important amount of vitamin B. An average portion of Pablum (1 ounce) as served at the table with milk and sugar offers unusually high nutritional values, namely:

Ca	P	Fe	Vitamins A, B, G	Protein	Fat	Carbohydrates	Calories
.53 gm.	.41 gm.	9 mg.	+ + +	13 gm.	10 gm.	39 gm.	295

The calcium and iron — minerals often deficient in the child's diet — generously aid in meeting the daily requirements. Substantial amounts of phosphorus and vitamins B and G are also furnished. In addition, there is a large measure of protein, fat, carbohydrates, and calories. That Pablum is "more than a breakfast dish" is being recognized by physicians who use it not only in infant and child feeding but also recommend Pablum to adults.

Pablum consists of wheatmeal, oatmeal, cornmeal, wheat embryo, brewers' yeast, alfalfa leaf, beef bone, iron salt, and sodium chloride.

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Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons.

DIARRHEA

"the commonest ailment of infants in the summer months"

(HOLT AND McINTOSH: HOLT'S DISEASES OF INFANCY AND CHILDHOOD, 1933)

One of the outstanding features of DEXTRI-MALTOSE is that it is almost unanimously preferred as the carbohydrate in the management of infantile diarrhea.

In diarrhea, "The sugar is added gradually ... conditions admit, some sugar other than milk sugar or cane sugar being used, preferably dextrin and maltose."—H. E. Small: Diarrhoea in bottle-fed infants. J. Maine M. A. 12:152-158, Jan. 1932.
Regarding the treatment of diarrhea, "In our experience, the most satisfactory carbohydrate for routine use is Mead's dextrimaltose No. 1."—F. K. Taylor: "Summer Complaints," Southern Med. & Surg., pp. 535-550, August, 1927.
In cases of diarrhea, "For the first day or so no sugar should be added to the milk. If the bowel movements improve carbohydrates may be added. This should be the one that is most easily assimilated, so dextri-maltose is the carbohydrate of choice."—W. H. McCaslan: Summer diarrheas in infants and young children. J. M. A. Alabama, 1:278-282, Jan., 1933.
In diarrhea, "Carbohydrates, in the form of dextri-maltose, well cooked cereals or rice, usually can be handled without trouble."—B. B. Jones: A discussion of some of the commoner types of infantile diarrhea, and the principles underlying the diets used in their treatment. Ohio State Monthly, 66: 411-416, 1926.
"The most desirable sugar is dextri-maltose, because of all the sugars maltose is least apt to ..."—A. I. Blau: The use of protein milk ... April 2,
Concerning the treatment of diarrhea, "If the weight remains stationary, it is an indication that loss of substance is occurring through the stools, mostly in the form of alkaline salts. To equalize this loss of substance, the diet must be increased, but in such a way as to avoid causing fermentation. This may be done by adding dextri-maltose and preparations of protein to the food, increasing the calories until the infant is taking 160 calories per kilo. of body weight."—H. L. Ratnoff: Nutritional disturbances. Arch. Pediat., 41:771 Nov., 1924.
SERIOUSNESS OF DIARRHEA
There is a widespread opinion that, thanks to improved sanitation, infantile diarrhea is no longer of serious aspect. But Holt and McIntosh declare that diarrhea "is still a problem of the foremost importance, producing a number of deaths each year. . . ." Because dehydration is so often an insidious development even in mild cases, prompt and effective treatment is vital. Little states (Canad. Med. A. J. 13: 803, 1923), "There are cases on record where death has taken place within 24 hours of the time of onset of the first symptoms."
use a preparation with a high dextrin and relatively low maltose content, as Mead's dextri-maltose."
"If it is desired to feed an unusually large amount of sugar to a baby, it is well to use a maltose-dextrin preparation, as in this way there is less danger of bringing about sugar fermentation than if lactose were used."—L. W. Hill: Practical Infant Feeding. W. B. Saunders Co., Phila., 1923, p. 207.
"Protein milk may be continued for several weeks when a gradual transition to a whole milk or evaporated milk formula, which will supply about one and one-half to two ounces of whole milk to every pound of body weight, is reached. This also should finally have the addition of dextri-maltose amounting to five to seven per cent."—R. A. Strong: Summer diarrheas in infancy and early childhood, Arch. Pediat. 47:344-354, June, 1930.
"It should be remembered ... of lactose may cause diarrhoea. ... centage of sugar be required it is better to ... it by dextri-maltose, such as Mead's Nos. ... where the maltose is only slightly in excess ... dextrins, thus diminishing the possibility ..."—W. J. Pearson: ... 6:38, 1930; ... April, 1930.
preparations are preferred, for they do not ferment readily, are rapidly absorbed and leave very little for fermentation."—V. A. Blenkle: Protein milks in infant feeding. Arch. Pediat., 42:743-760, Nov., 1925.
". . . I begin to add carbohydrates slowly, by replacing ¼ ounce Casec every two days with ¼ ounce of Dextri-Maltose, preferably Dextri-Maltose Number one. As a rule, this is tolerated. When one ounce of Dextri-Maltose is used, the Casec, of course, should be discontinued."—J. ... Reed: The etiology and ...
"When sugar causes diarrhoea one can change the form of it. Mead's Dextrimaltose in small doses is more quickly absorbed and so superior to castor [cane] sugar. Lactose is expensive and seems not to be better than castor sugar."—H. B. Glad-stone: Infant Feeding and ...
"Milk-sugar, which has been so extensively used in the past, should never be used where there is any digestive disturbance. It is not as easily digested as either cane-sugar (granulated sugar) or dextri-maltose. The latter is the best of all sugars to use, especially if there is any tendency to looseness of the bowels."—A. Brown: The Normal Child; Its Care and Feeding, F. D. Goodchild Company, Toronto, 1923, p. 120.
In cases of malnutrition and indigestion, "The appetite improves rapidly, and the stools soon become normal in appearance, if the sugars are intelligently prescribed. By this I refer to proper proportions of dextrin and maltose. When added to protein milk, was of great ... any practitioners still use protein ... ged periods without adding carbo... st be emphasized that regardless of ... of the stools, carbohydrate must be ... ean milk within a reasonable time ... void collapse."—G. J. Felldstein: ... fants and children. Arch. ... 1933.
"After the preliminary short period of starvation, protein milk should be used. . . . When the diarrhoea has been sufficiently checked, dextri-maltose may be added and gradually increased until from 4 to 6 tablespoons are being used."—W. L. Denney: Acute nutritional disturbances of infancy. Univ. West. Ontario M. J. 2:132-137, April, 1932.
"Milk-sugar, which has been so extensively used in the past, should never be used where there is any digestive disturbance. It is not as easily digested as either cane-sugar (granulated sugar) or dextri-maltose. The latter is the best of all sugars to use, especially if there is any tendency to looseness of the bowels."—A. Brown: The Normal Child; Its Care and Feeding, F. D. Goodchild Company, Toronto, 1923, p. 120.
For cases of fermentative diarrhea, ". . . the ideal plan of treatment would be to give a food which is low in sugar (the food which that group of organisms thrive on) and high in protein. Calcium caseinate milk accomplishes this purpose. In our series of cases, we found it was necessary to use the casein calcium for from 5-8 days; we then stopped it and added dextri-maltose to the formula."—A. G. DeSanctis and L. V. Paider: The value of calcium caseinate milk in ... diarrhea, Arch. Pediat. ...

Just as DEXTRI-MALTOSE is a carbohydrate modifier of choice, so is CASEC (calcium caseinate) an accepted protein modifier. Casec is of special value for (1) colic and loose green stools in breast-fed infants, (2) fermentative diarrhea in bottle-fed infants, (3) prematures, (4) marasmus, (5) celiac disease.

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